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SURRA; OR PERNICIOUS ANÆMIA IN THE LOWER ANIMALS.

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To say a very little on the vast subject of the pathology of *Surra* and its classification is all that will be attempted at present, as a writer must be guided in selection of any phase of a subject, not so much by looking for what is most important, as by the current of thought at the time, and, at this time, who is not drawn into the question of the pathology of Surra?

The question apparently remaining unanswered now is, What *is* Surra? If it is due to an excess of development of the parasites found in the blood of animals suffering from Surra, has that disease any equivalent in the human subject, and what is its pathology? as I believe this question has never been satisfactorily answered before.

The most important fact to determine appears to me to be, not merely the presence of the parasites, and their morphological characters, but to show their precise significance and the part they play, if any, in the production of the disease. Mr. Steel has viewed the subject, so far, more especially with reference to the anatomical peculiarities of the parasites found in this disease, a study which has been elaborately gone into by specialists in England and America, and by Dr. Crookshank (*Journ. Micr. Soc.*, Ser. 2, Vol. vi., 1886) and Prof. Wm. Osler (*Brit. Med. Journal*, 12th March, 1887) in particular. I do not think I need dilate, therefore, on this subject any farther than to show that we have not yet considered the pathology of the disease called Surra, apart from the presence of the parasites described by Inspecting Veterinary Surgeon Dr. G. Evans many years ago. This seems strange, seeing that the disease has been known for many years

on the continent of Europe as the equine form of Pernicious Anæmia described by several authors.

Among continental veterinary surgeons there seems to be unanimity as to the proper place for this disease of the lower animals, the malady being recognised now to be Pernicious Anæmia. This unanimity does not appear to have made itself felt up to date in India. Many still seem to think that Surra must always remain an obscure disease, known only by the presence or absence of the parasites. The clinical characters of the disease, however, contain many features of diagnostic value, and which afford correct classification. The disease has a pathological equivalent in Pernicious Anæmia of man—has a similarity of history and results, as may be seen by a comparison of these in the two classes of patients mentioned.

Mr. Steel has duly corroborated Dr. Evans' statements; but he leaves the facts essentially where Dr. Evans left them. He does not deny that the pathology of the subject should be more thoroughly investigated, though the suggestion put forward by him that it would be found to be equine Relapsing Fever (*Official Report on Surra*, 1884) has not been justified by the facts. The only argument Mr. Steel brings forward for considering this disease to be equine Relapsing Fever is, that after a certain period of apyrexia, the fever returns; but it does so again and again for a prolonged period, *viz.*, of six weeks to two months, or more, which is *not* the history of Relapsing Fever, and is characteristic certainly of Pernicious Anæmia, not only in the human subject, but in the lower animals equally. The inordinate rate of mortality from this disease is also opposed to the history of Relapsing Fever, and more characteristic of Pernicious Anæmia.

A point of interest Mr. Steel has noted in the case of Surra in India, and other veterinary surgeons have done in that of Pernicious Anæmia seen in Germany, is the well-worn, but mysterious subject, the paroxysms of increase of temperature, the so-called "Anæmic Fever" of writers on Pernicious Anæmia in the human subject. (*Practice of Medicine*, 1881, by M. Charteris).

Zschokke, also, it is well-known, has assigned a prominent place to this fever, which he found to be of an intermittent type in the horse (*Scheweizer Archiv für Thierheilkunde*, Bd. 25, 1885), and Fröhner has likewise noted a marked rise in temperature on the fourth day, which, with slight remissions, remained high till death (*Archiv für Wiss. u. Praktische Thierheilkunde*, Bd. 12, 5 *u.* 6 Heft, 1886).

Periodicity, which is perhaps the most characteristic feature of this disease, is, after all, but an uncertain guide; for all febrile diseases, and those due to micro-organisms in general, have more

or less definite or regular periods of diminution or exacerbation.

The marked anæmic conditions, observed both *ante* and *post-mortem*, the leucocytosis, fatty degeneration of the muscles, liver, spleen, kidneys, and other organs, the general hæmorrhages, and the chronic state of fever—which end in death in so many cases—leave no doubt as to the nature of the disease.

The short facts are that, if we compare the several features of Pernicious Anæmia with those of Surra, the identity is very plainly apparent. When we include a broader horizon and consider all the clinical peculiarities, or those features by which we most readily recognise the disease, we find abundant evidence of identity between Surra and Pernicious Anæmia in the horse.

Now, with regard to the parasites in Surra, to which I attach importance. The only point especially to note is that, besides the organism described by Dr. Evans and named after him as the *trichomonas, or hæmatomonas Evansi*, there is sometimes found another, a bacillus, and which I believe to be more or less common, though not specially connected with the disease. These two organisms are not always found together; one or the other may be absent.

The same bacillus was found associated with Beri-Beri in Burmah ponies by Dr. Wallace Taylor (*Report on Beri-Beri*, or *Kákke*, 1880), a disease marked by paralysis of the hind quarters and extremely fatal, symptoms which have been remarked also in Pernicious Anæmia of equine patients described by German veterinary surgeons (*Archiv für Wiss. u. Praktische Thierheilkunde*, Bd. 12, 5 *u.* 6 Heft, 1886).

Has the organism in question any connection with disease, or is it a special organism only associated with it, and whose life-history is not yet determined? are questions which cannot be considered as settled. It is certain that these comparatively new phases of disease in our animals open out an almost illimitable area for researches, and may, I trust, lead to the suppression of many of those repeated outbreaks which have baffled all our combined efforts.

We are proud to know that veterinary surgeons who have served in India have already made some advance in the knowledge of this disease, but we must readily and gratefully acknowledge the heroic self-sacrificing and successful labours of Dr. Griffith Evans and Mr. Steel chiefly and especially.

The difficulties in elucidating many questions associated with our subject are great. It is desirable to learn the state of things peculiar to this disease in the human subject first, and yet a want of practical acquaintance with the latter renders this well-nigh

impossible; and the sameremark attaches to most of our diseases, which at first seem peculiar or unique in veterinary practice. The analogy between many diseases yield to inquiry such as has been mentioned, and I anticipate that our experience is alike in this case, that we all recognise a closer relationship between the human and equine form of this than was formerly done.

M. Netter shows (*Archives de Medicine*, 1884) that two of the micro-organisms found in the alimentary canal, in its normal state, are also found, up to a certain distance, in the bile-duct. He asks whether, under certain conditions, these micro-organisms may not pass from the bile-duct into the blood, and thus be the cause of serious lesions. The micro-organisms found in the blood and in the bile are the staphylococcus pyogènes aureus, and a bacillus which gives rise to culture colonies of an opaque white colour, and very rapid in growth. These two micro-organisms, however, are not always found together; one or the other may be absent. If the infection is due to the staphylococcus, the rectal temperature of the animals experimented on rises to 105·8°F. If, on the other hand, it be due to the bacillus, the rectal temperature falls to 98·2°F.

Professor Ebstein has recently described a form of Chronic Recurrent Fever, which he considers to be a new infectious disease. The disease begins with feverish attacks, which cease after a time, and recur after a definite interval; so that pyrexia and apyrexia alternate with a regularity which is not seen in any other disease. Each attack lasted on an average from thirteen to fourteen days, the apyrexia from ten to eleven days; so that from the height of one attack to the corresponding period in the next, the interval was about twenty-four days. Treatment usually had no effect. Pel, in Amsterdam, has seen the same disease. He at first thought it was an irregular form of Typhoid Fever. The *post-mortem* examination always showed the spleen and the retro-peritoneal, mesenteric, and bronchial glands enlarged. Professor Ebstein, however, thinks that we give the same name (Pseudoleukæmia) to two different diseases, of which one has a febrile course, whilst in the other there is either no fever or an irregular one. Typically, only the latter should be called Pseudoleukæmia; the former he proposes to call "Febris Recurrens Chronica," and places it in the category of infectious diseases. Pel, in reply to Ebstein (*Berliner Klinischen Wochenschrift*, No. 35, 1887), shows that the cases he published in 1886, were entirely similar to Ebstein's. Pel does not think the disease entitled to a new name. He calls it an extremely infectious form of Pseudoleukæmia.

I think the above will go far to explain many of the anomalous features connected with the late Meerut outbreaks, and the only

explanation I can offer with reference to the conflicting nature of the reports concerning the outbreaks is that we have had to deal, most probably, with two or more diseases prevalent there at different times.

Gastric ulcers were frequently seen in the Burmah outbreak in transport mules; and it is a matter of fairly common belief that chlorotic women are especially liable to gastric ulcer, and to the worst accident of such a lesion—namely, perforation; and in this the Burmah disease was not peculiar. The ulcer itself, once formed, probably suffers from nutritional defect, owing to the impoverished state of the blood, which prevents the formation of resisting tissue around it. This lesion is not present in all outbreaks of Surra, however, as Dr. Evans also, who was the first to describe this disease in India, makes no mention of it in his report. It is possible, also, that a great many cases of gastric ulcer in the Burmah outbreak were complicated with Remittent Fever of equines (Burke), which is not at all an uncommon disease of tropical climates, and may be frequently seen not alone in Burmah, but in many parts of India also.

The possibility of confounding Surra with other diseases is manifest. And it is quite probable that the gastric ulcers which appear in many cases may be due to simple Remittent Fever common to hot climates, or it may be merely a result of Pseudo-chlorosis or Leukæmia above described. There can, we think, be little doubt that the term Surra is an elastic one, and that more than one essential disease has been included under it.

We are on the eve of grave changes in the nomenclature of disease in the lower animals, and those writers who are to follow us may have to speak of fevers which have not passed the stage of discussion to-day. The points of interest are so many, and the views concerning these so immature, that any one studying the literature of this subject may fairly ask if the last word on Surra has yet been spoken. But notwithstanding this element of doubt, I think that, taking all the facts together, the pathology must be accepted as Pernicious Anæmia, rather than Relapsing Fever of equines.

We need accuracy in diagnosis to help us to the best ways available of arranging the facts observed in practice, or, as a teacher lately expressed himself, "We require explanations of many of the facts which we observe."

I have now dealt as completely as space permits with the various points of analogy between Surra and Pernicious Anæmia of man and lower animals. The question remains, and a very practical one, the significance of the parasites noticed in this disease. There can be no doubt as to the interest that attaches

to the history of the parasitic forms found in the blood of Surra (Evans, 1879) and Pernicious Anæmia in man (Perroncito, 1880). These observers have noted the presence of a parasite in all the patients examined, and in animals subjected to experimental inoculations; but it has not been proved at least that this parasite is the cause of the disease. In the first place, there is no proof that the parasite which is contained in the blood used for inoculation has caused the disease; and secondly, the organism has never been isolated apart from the blood in Surra, and the disease then produced by inoculation of healthy animals; while, in a recent inquiry, it has been shown that these organisms are to be found in "no less than 25 per cent. of apparently healthy rats." And Dr. Crookshank states that the closest examination has confirmed his belief "that the parasites found in the blood of healthy rats are morphologically identical with the stained parasites of Surra." Dr. Evans had also noted the presence of parasites of different species in the blood of diseased as well as healthy camels (VETERINARY JOURNAL, 1881, p. 10).

Since all observations prove the existence of parasites of different species in the blood to be compatible with health, we have no reason for wonder when we find them greatly increased during disease.

In all kinds of animals, then, this parasite must exist, ready to assume its active form whenever the conditions of climate, of weakness, and of ill health present themselves afresh. Without doubt, the parasites which are the cause of this disease are widely prevalent, and exist in the blood of most animals, but attenuated; and in this state an animal may harbour them in its blood without showing much, if any, illness. They only become dangerous when, through over-crowding and other causes, in bodies enfeebled by disease, their virulence becomes exaggerated. The remarkable tendency of the blood to harbour parasites has been a matter of not recent observation. Their characteristic features manifest a disposition to augment in numbers under any shock or depression of the system. Sometimes prolonged exposure to malarious and ill-sanitary influence, debilitating effects from impaired nutrition, from Hyperpyrexia, etc., issues in a morbid alteration of the blood peculiarly fitted for the growth and multiplication of these organisms; but even when no change in the surroundings of the animal is discoverable, a deep impression is often stamped upon the system, leading to their increase.

These parasites are usually classed as filaria, and they do not seem to excite any disease when in moderate numbers. In other cases, Apoplexy may result from embolism of the heart and closure of the valves; and also the embryos appear to cause Apoplexy

by blocking up the capillaries of the brain. Besides this, they may cause epileptiform convulsions and Anæmia and wasting; also hæmorrhages into the lungs and skin, and varied symptoms.

Under weakened states of the body, as in Surra, doubtless the parasites multiply rapidly, and even assume pathogenic properties. See a remarkable case of "Filaria Immitis in the Heart of a Dog, Causing Death," in the VETERINARY JOURNAL, 1881. We have here a case in which the parasites *became* pathogenic, and too much stress must not be laid on the pathogenic properties of the somewhat similar organisms found in the blood in Surra. There is strong evidence in favour of the belief that the parasites assume pathogenic properties under favourable conditions; but it should also be stated that the parasites in Surra are only associated with the disease, the impoverished blood affording a suitable nidus for their development.

We naturally ask if there be any analogy in the behaviour of other parasites in this respect? Dracunculus may cause little or no trouble in the earlier stages, but developing, changing place, and discharging its embryos, the gravest results follow; trichina in its earlier stages is comparatively unfelt, but may become the cause of fatal disease. We know how severely animals suffer from the presence in the blood of other minute organisms. Phthisis in sheep, for example, is produced by strongylus filaria; Chlorosis in man owes its origin to the dochmius doudenalis (Leukhart); whilst not only Anæmia, but Liver Disease and a form of Dysentery, are produced by the same parasite (Fayrer), which is not very unlike filaria sanguinis hominis. It seems impossible but that other diseases caused by parasites analogous to the dochmius should be common in India.

The strongylus tetracanthus gives rise to epizootic outbreaks of emaciation in horses in many districts of England (Gresswell, *Manual of Equine Medicine*, 1885); the strongylus contortus has been known to produce a form of Pernicious Anæmia in the horse (*poikilocytose*) observed in the Buenos Ayres (Wernicke, *Deuts. Zeits. f. Thierm u. vergl. Pathologie*, 13 Bd., 2 *u.* 3 Heft, 1887); the presence of the anchylostomum doudenalis and the trichocephalus dispar in the intestinal canal gives rise to Anæmia, or Beri-Beri in man (Kynsey, *Report on Anæmia, or Beri-Beri, of Ceylon*, 1887), and the same parasites have been found associated with Pernicious Anæmia in the lower animals, attended with Paralysis, and which has been described by Professor Fröhner (*Archiv. f. Wiss. Prakt. Thierheilkunde.* Bd. xii., 5 *u.* 6 Heft, 1886), and other veterinary surgeons; the filaria sanguinis equi were found by Dr. Sonsino in the blood of the horse in Egypt; and it is also seen that the dogs in China die suddenly from interference

with the heart's action, due to filaria sanguinolenta—whether to direct mechanical obstruction, or to altered conditions of the blood, it is difficult to say; but that which occurs in the dog may, in a similar way, take place in the horse and other animals.

The Surra parasite of Evans' was described as a spirillum, but, examined under higher powers of the microscope, it was soon apparent that it was a more highly organised micro-parasite, presenting very peculiar and distinctive appearances, as Dr. Evans showed, and Dr. Crookshank has corroborated his observations.

Of the causes to which Surra is due, water-supply is probably the chief. This is the primary source, as water it is that harbours more than two-thirds of the parasites common in our animals. We may be certain that the fully-developed Surra parasite finds its way into the alimentary canal through the medium of water, and then gains entry into the circulating blood. How, and in what way, this latter mode of access takes place has not been suggested in the case of the Surra parasite, but I believe, with regard to its mode of entry into the animal's body, its *habitat* and the manner in which it becomes fecundated and finds its way into the blood-vessels, we may look with confidence for an early solution of what now seems obscure. I think the suggestion of M. Netter, already referred to, is a most reasonable one; evidence is now accumulating to show that in it is to be found an explanation of much that has hitherto been uncertain with regard to the mode of entry peculiar to many helminths found in the blood.

Principal Veterinary Surgeon George Oliphant, in his letter dated Feb. 12, 1887, writes—"In one outbreak of Surra in the 18th Bengal Calvary, in which 180 horses died, I made dozens of *post-mortem* examinations, and the appearances in all were identical—extreme pallidity of all the tissues, with perhaps a trifling serous effusion into the abdomen, etc. In fact, the animals looked as if they had been starved to death"; and Zschokke also states "That none of the principal organs show any marked structural change." Besides Anæmia he has noted "Hæmorrhages under the serous membranes, swelling of the liver and spleen, loss of striæ in the muscular fibres of the heart, blood extravasations in the marrow of the bones, and a decrease in the number of red corpuscles in the blood"—the same as in Pernicious Anæmia in man.

Mr. Steel speaks of "Mucous congestions continuous throughout the anterior two-thirds of the bowel, with the presence of several species of worms," although he attaches no importance to these as a probable factor in the etiology of Surra. Dr. Evans had already alluded to the presence of petechiæ and yellow staining of the mucous lining of the small intestine; so that this fact is significant in the history of Surra—the exact relations of mucous conges-

tion to Pernicious Anæmia in man having been already ascertained. It is impossible to say whether this congestion of the intestinal mucous membrane is essentially connected with the presence of the worms seen in Surra. It is a phenomenon of other specific fevers, and is generally ascribed to blood-vascular pluggings and minute extravasations of blood, but it *may* be due to direct irritant action of the worms, the same as in Beri-Beri or Pernicious Anæmia of human beings. The early symptoms of Hepatitis present in Surra, which is shown by Jaundice of the visible mucous membranes, may be due to congestion of the liver, caused by irritation of the worms in the biliary capillaries, leading to their rupture, and consequent deposits in the gland-substance, such as have been described by Dr. Evans in these cases. There is every reason to believe that when the liver has become so invaded, it is incapable not only of duly performing its own function of secreting bile, which is essential to proper digestion and health, but that it is an abiding pathological source of general Jaundice, which, if not removed, may result in the gravest evils—blood disorganisation, general Anæmia, Anasarca, etc. And in such cases the Hepatic complication appears so marked that it is sometimes difficult to say what share in the disease should be assigned to it, and what to the action of the parasites on the blood.

With respect to duration in Surra, it is almost diagnostic of Pernicious Anæmia, as Dr. Evans says, "that the average duration of the disease is probably not less than *two months*"—the same as in Pernicious Anæmia in man.

From a comparative point of view, it is interesting to observe how the above manifestations of Pernicious Anæmia correspond with those shown in man, in whom the fatality, duration, and course, and other features peculiar to this disease in animals, are represented by so closely allied characters. The marked Anæmia noted in Surra, the paroxysms of increase of temperature, the duration and course, and the extreme fatality, together with the history of the parasites seen in the blood, form a group of conditions sufficiently diagnostic of Pernicious Anæmia. The Leucocytosis, which is a marked feature of Pernicious Anæmia, is also characteristic of Surra, and which in typical cases is always present.

The views expressed as to the pathology of Surra have been throughout based upon, or brought into harmony with, the experiences of medical men regarding Pernicious Anæmia in man, and which is essentially the same disease in the lower animals, described by veterinary writers; it is, indeed, difficult for any one who will partially weigh all the points, to arrive at any other conclusion as to its pathology. A stumbling-block of former writers

was the pathology of Surra, a large mass of clinical evidence to hand notwithstanding. There can now be no reasonable doubt that there is a very clear analogy between Surra and Pernicious Anæmia of man and the lower animals, and that the disease in animals is as prevalent, perhaps, as it is (in many tropical and sub-tropical parts) in human beings.

Of the many drugs which have been suggested for this malady, none can be regarded as absolutely reliable, although arsenic and steel are believed to have some value. Thymol has been recommended as a specific for Anchylostomiasis or "Beri-Beri" of Ceylon, and it may be tried in cases of Surra seen in India. Chloride of ammonium should be given to relieve symptoms which are chiefly referable to congestion of the liver. *Atees* is much used in native practice, and there may be cases wherein it might be expedient to use it; but it can in no way take the place of arsenic, iron, or thymol. Dr. Macdonald speaks very highly of the value of calomel in these cases (*Brit. Med. Journ.*, Oct. 15th, 1887). The calomel is said to be necessary to remove the profuse mucous secretion in the intestines which protects the worms. Change of locality and climate is most favourable to recovery in these cases. The prevention consists in sound hygiene, care in avoidance of stagnant water, and protection from damp soils and extremes of climate.

Believing that the Meerut Canal is the feeding ground of the Surra parasites, as well as of other micro-organisms, I would urge that the ponies belonging to the 8th Hussars, which were until lately tied by the water's-edge, be removed to a safe distance, where they can have no access, accidental or intentional, to contaminated water-supply. The grain diet should be soaked in the purest water.

In a report on "Beri-Beri," by Surgeon A. A. Lyle (noticed in the *Lancet* of Oct. 15th, 1887, on pp. 778-9), the disease is believed to have been propagated through excreta; but there seems some reason to connect its appearance with an inadequate supply of food, and that of an unsatisfactory character.

The connection between Surra and Pernicious Anæmia being made evident, the still-existing controversy regarding Anthrax prevalent in Meerut at different periods, may be considered. Quite recently it was questioned whether Remittent Fever is ever found associated with Anthrax, because it is stated that the Surra parasite was discovered, in some cases witnessed, in Meerut, both before and twelve months after my investigations were made in that station; but I think a very little reflection will show that we have probably had two or more diseases to deal with in Meerut at one and the same time. And the temperature charts of

numerous cases kept by myself, as well as other veterinary surgeons, make it clear at least that we may have cases in the horse of what I consider well-marked Intermittent and Remittent Fever. The association of the Surra parasite proves nothing, since if the Surra parasite were witnessed in some cases, in others Anthrax bacilli were also present; which I demonstrated to the other veterinary surgeons in Meerut at the time of my investigations, and provisionally termed the disease Remittent Anthrax.

I will quote, in support of my observations, Dr. Fleming, who is one of the leading authorities on animal diseases in Europe. He says:—"Veterinarians have long noticed that domestic animals living in malarious regions have the paludal cachexia, and that in them Intermittent Fever *often complicates or accompanies other maladies*, sometimes even occurring after operations or accidents. . . I may add that in 1861 I had several cases, among horses in North China, of what I considered well-marked intermittent. . . . All the types of the disease have been witnessed: quotidian tertiary, etc. . . . Often there is gastric disturbance, and in the dog vomiting." (*Climate and Fevers of India*, Fayrer, 1882.)

In the writings of English veterinary authors, next to nothing has been said of the many simple fevers common in animals, the largest, the most engrossing, and, in some senses, the most important, certainly the most difficult, department of veterinary medicine, and their study has been practically ignored in the past; but it is mere trifling to label any department as forbidden ground.

Those who wish to acquire a knowledge of the literature of Intermittent and Remittent Fever in the lower animals, may consult the excellent work of the veterinary professors (Friedberger and Fröhner, Vol. ii.), which has just been issued, and in which an exhaustive account of the fevers mentioned above is given.

I have elsewhere called attention to the fact that, not only Surra, but Anthrax and other specific diseases, may follow on an attack of simple Intermittent and Remittent Fever in animals, pointing out that, in the late Meerut outbreaks, Surra and Anthrax may have supervened, in different cases, on well-marked Intermittent and Remittent Fever; yet that this did not explain the pathology of other cases in which the same type of fever was observed, according to the temperature charts, in whose blood neither Anthrax bacilli nor Surra parasites could be demonstrated. (*Supplement to Report on Remittent Anthrax*, 15th March, 1887.) There may be cases in which harmless organisms are frequently associated with disease. Considering the large number of troops which were assembled in Meerut last year, it would be rash to conclude that all, or even the greater number of the cases recorded

were those of Surra or Anthrax only. The greater number, if not all, of these cases recovered, whereas Surra has been described as an "invariably fatal" disorder in the lower animals.

It has been observed that in some of my cases in which the Anthrax bacilli were demonstrated, the disease did not run a rapid course as seen in other outbreaks of that disease. The theory I would suggest to account for this is, that the bacilli exist in many gradations of intensity. Anthrax has been seen to manifest itself in every gradation of severity, from slight fever and dullness to the most severe types met with in India. Veterinary surgeons on the continent of Europe have long been familiar with different types of Anthrax seen among animals, but especially *Anthrax acutissimus*, *acutus*, and *subacutus*, also *Anthrax remittens*. It is further ascertained, as a matter of observation, that certain micro-organisms cannot thrive well, or do so very imperfectly, in one body under certain conditions, whereas they may be pernicious when certain other conditions are present. It is known that, not only in an animal's body, but cultivated in artificial media, bacteria may retain their properties unaltered, or they may undergo more or less modification. (*To be continued.*)

A NOTE ON THE "HORSE SICKNESS" OF SOUTH AFRICA.

BY J. CAMMACK, M.R.C.V.S., KIMBERLEY, SOUTH AFRICA.

MR. RUTHERFORD states, in his paper read before the Norfolk Veterinary Medical Association (and he has stated it elsewhere in copious letters to the daily press of South Africa), that South African Horse Sickness is Anthrax. If this be so, why do we not meet with it in ruminants grazing where ninety-five per cent. of all equines die from Horse Sickness? And over large areas this is so.

Why does Horse Sickness cease in cool weather, if it be Anthrax?

Why do infected lands, when herbage is scanty, become safe for horses after drying by the morning sun, as every farmer in South Africa knows is the case, though he knows equally well that the spores and bacilli of Splenic Fever are not thus dissipated from the same fields?

Why are the cold districts of "Cape Peninsula" free from Horse Sickness for twenty years at a time, though over large areas of it parts of farms are the scene of Anthrax in every month of every year?

Why, in the thin-soiled parts of Griqualand West, where rain is absent for nine to ten months every year, do we meet Horse

Sickness in March and April only (the autumn), and Anthrax every month of the year, if these be identical diseases?

It is not enough for practical (is it for other?) veterinarians to accept the microscopist's demonstration of *Bacillus anthracis* as a cause of disease. Cannot we manage to avoid optical tools and methods that render us unable to distinguish different pathogenic bacilli? Mr. Rutherford assures himself he has seen this bacillus in Horse Sickness, yet Horse Sickness is not Anthrax, nor is it very plain why accurate people should nominate it "anthracoid"—a term scientific pathologists ought to discard. We are told of a bilious form of Anthrax, in which fifty per cent. of horses recover in South Africa. May I assert that this bilious affection is not found in certain large districts of South Africa where Horse Sickness, Anthrax, and at least three other blood poisons (some peculiar to the equinæ), which I have no permission to describe (clinically or otherwise) in your pages, frequently occur? How is it Mr. Rutherford has not told us something of inoculation experiments with these interesting forms of what he says is Anthrax?

Two years ago it was pointed out and *proved* by the veterinary surgeon to the Cape Government, that Horse Sickness is not Anthrax.

CONTRACTION OF THE LIMBS.

BY KAY LEES, F.R.C.V.S., A.V.D., NEWBRIDGE, IRELAND.

THIS designation has been given to the permanent contraction or retraction of certain muscles—and, we might add, tendons and ligaments—which, in becoming hard and rigid, are at the same time reduced in length and thickness, so as to form inextensible cords which fix the parts they are attached to, and prevent their assuming their natural position (Fleming).

In March last I had (with Mr. S. M. Smith, A.V.D.) the opportunity of seeing a very interesting case of congenital contraction of both fore limbs in a thoroughbred foal. It was the day after birth. I found the creature with its dam in a comfortable loose-box. It looked bright and healthy, but was lying upon its side, being quite unable to stand, and had to be raised and held while sucking. The dam showed great affection for it, and was in a considerable state of excitement for the first few days, being off her feed, and suffering from simple diarrhœa. The foal on being raised was found quite unable to support itself on its fore legs, though it made every attempt to do so, but it was able to stand on the hind legs. The left fore limb was found bent to an acute angle at the knee, while the fetlock and pastern were in their natural position. The toe of the foot could at intervals be placed

upon the ground. The right fore leg was also bent at the knee to nearly the same degree as the other, and it was with difficulty that the toe of the foot could be placed upon the ground. On examining the left fore leg, the flexor metacarpi externus and medius muscles, together with their tendinous portions, were found in a retracted and rigid condition; the muscular portions were firm, unyielding, shortened, and dense—in fact, in a tonic condition, while the tendinous portions were hard and cord-like, feeling more like dried than living tissues. The right fore leg presented a similar condition, the flexor metacarpi externus and medius, flexor pedis perforans and perforatus muscles being affected in the same way, but perhaps not quite to such a great extent, as the muscular and tendinous portions were scarcely so dense and rigid. The methods adopted for the restoration of the parts were hot fomentations, with gentle hand rubbing, succeeded by the application of hot, dry flannel. This relieved the tonicity of the muscles, so as to enable the limbs to become more extended, and in a few days leather splints were applied behind the knees and fetlocks, well padded with tow, and the limbs from the fetlocks to the middle of the radû, covered with starch bandages. In a few days the limbs could gradually be more extended, but the splints and starch bandages were re-applied. I understand that the foal progressed favourably for some time, when she changed hands and I have entirely lost sight of her.

How these contractions are caused seems a matter of doubt. It appears that parturition was somewhat protracted, and the foal was in the maternal passage for some considerable time, with the head and part of the fore legs protruding, the latter being bent at the knee. Whether this, together with the influence of cold air and pressure from the contractions of the vulva, had any effect in producing such undue tonicity of the muscles and ligaments I cannot say, but it would seem most probable.

While serving in Northern India I had the opportunity of seeing a similar case: both fore legs were bent at the knee to an acute angle, rendering the foal incapable of assuming a standing position. The flexor metacarpi externus and medius muscles, together with their tendinous portions, of both fore legs, were in a retracted, tonic, and rigid condition, the tendinous portions being very prominent, and feeling like so many cords. The methods adopted in this case were tenotomy, after which the limbs could be fully extended. The application of splints, padding, and starch bandages was also resorted to. The foal in a few days was able to stand, and in the course of a fortnight was quite relieved. On removal of the splints, etc., the muscles affected were found in a normal state, and the foal afterwards made a rapid recovery.

Editorial.

IS TETANUS A CONTAGIOUS DISEASE?

Of late years, the list of diseases which can be communicated from sick to healthy creatures has been rapidly lengthening, until now it begins to look somewhat formidable. A quarter of a century ago the transmissible diseases of animals were supposed to be comparatively few. They could almost be counted on the fingers of one hand; now-a-days, it would almost appear as if the great majority of maladies could be conveyed, either by mediate or immediate contact, to susceptible animals, and the number is still being added to.

The last addition to the list is, if we may credit clinicians and experimental pathologists, as well as bacteriologists, that with which veterinary surgeons are tolerably well acquainted,—more so, perhaps, than medical men. We allude to Tetanus: one of the most painful and formidable disorders known, and one which is attended with such fearful mortality. Until quite recently no one would have regarded it as a transmissible disease, or even suspected it as being in any way allied to the zymotic class. Looking back over a long series of years of practice, during which we have had, we suppose, a fair share of cases of Tetanus, we cannot call to mind a single instance in which there was any reason to suspect transmission from the tetanised horse to other horses, or to its human attendants, as no evidence whatever of this kind presented itself. All the cases observed among horses were sporadic, and never more than one occurred in a place at the same time. We are aware that in the practice of some veterinary surgeons cases of the disease have been more frequent than in that of others, and also that it is somewhat common in certain localities; but though these phenomenal manifestations were ascribed to many and diverse causes, yet it was generally admitted that they could not be satisfactorily accounted for, and we fancy infection was never dreamt of.

Though previously suspected to be so by others, Billroth in 1874 (*Allgem. Pathologie*) stated his belief that Tetanus was due to a specific intoxication of the blood. Subsequently, Arloing, Möller, Friedberger, and others, attempted to produce the malady by transfusing blood from a horse suffering from Tetanus to healthy horses, but with negative results. In 1882, Nocard inoculated the cerebro-spinal fluid of horses dead of Tetanus into sheep and goats, which remained unaffected. From these experiments it was inferred that it was not a septikæmic or infectious disorder. With the advent of more refined bacteriological methods, and exact and careful experimental investigations, on this, as on other diseases, much light has been thrown. Nicolaier, in 1884 (*Deutsche Med. Wochenschrift*) first detected a bacillus which he believed to be the cause of Tetanus, and which

he proved to be so by injecting it subcutaneously into rabbits, and producing the disease in them. Rosenbach arrived at the same results, though he was not successful in cultivating satisfactorily the *Bacillus tetani* (Langenbeck's *Archiv*, Band xxxiv.). It was inferred that this germ produced a chemical poison, which, acting upon the nervous system, developed the severe continuous muscular spasms; and Brieger (*Deutsche Med. Wochenschrift*, 1887), has found a substance in the body after death from Tetanus, which he supposes is so produced, and which he has named "Tetanin." Davide Giordano (VETERINARY JOURNAL for December, 1887), by a series of interesting experiments proved that the disease is due to a micro-organism, and is infectious and inoculable, being capable of transmission from man to animals, and from one animal to another; the bacillus producing the disease, either directly or after cultivation. The bacillus, he maintains, however, is localised at the wound, no results having followed inoculations with the blood or spinal cord of the man. In this he differs from Nicolaier and Rosenbach. Quite recently Dr. Shakespere, of Philadelphia (*British Medical Journal*, October, 1887), has corroborated the last-named investigators' statements, by a series of experiments upon rabbits with preparations of the spinal cords and brains of horses and mules dead from Tetanus. The matter was injected subcutaneously or beneath the dura mater, after being pulped in broth or glycerine, or cultivated in agar-agar. From his experiments he concludes that Tetanus is an infectious malady, that the virus is located in the nervous system, and may be rendered more active by its passage from rabbit to rabbit, and diminished in intensity by dessiccation, while its effects are more marked when inoculated intra-cranially than subcutaneously. Nocard has quite recently found that dried blood and pus scraped from instruments employed in castrating horses, all of which had died from Tetanus, caused that disease when inoculated into rabbits.

At the congress of French veterinary surgeons in 1886, a discussion took place upon this disease and its origin, and it was then mooted that mankind might derive it from the horse species. One of the chief supporters of this view is Verneuil (*De l'Origine Equine du Tetanos: Gazette Hebd. de Med. et de Chirurgie*, 1886), who even gives instances of such transmission on the authority of veterinary surgeons and others. And Dieckerhoff (*Lehrbuch der Speciellen Pathologie und Therapie für Thierarzte*) gives a very circumstantial instance, which seems to favour the possibility of such transmission.

The new notions to which we have alluded with regard to Tetanus require, and will now no doubt receive, further elucidation. The experience of veterinary surgeons will be brought to bear in this direction, and surely there can be no difficulty in arriving at the conclusion whether or not the disease is to be classed with those which may be communicated to healthy animals, and from these to our own species. As before mentioned, our own experience is opposed to such a conclusion; but it must be confessed that the experimental, bacteriological, and other evidence which has been rapidly accumulating in quite recent days, rather disposes us to waver in our opinion.

THE SCARLET FEVER GERM.

SEVERAL months ago we gave an account of the interesting processes by which Dr. Klein and Mr. W. H. Power, of the medical department of the Local Government Board, apparently established the relation between a disease found on the udders of some cows at Hendon and Scarlatina in man. The Cow Disease was not itself Scarlatina, but by cultivation of the organisms obtained from the cows the specific micrococcus of Scarlatina was supposed to be produced. Moreover, this cultivation was made in milk, and it was the milk of the affected cows that caused the Scarlatina epidemic which gave rise to the inquiry. Then it was proved that the virus of the Cow Disease, if conveyed into the human body by the medium of milk, developed there into the germ of Scarlatina, although between the Cow Disease itself and Scarlatina there is almost every possible difference. This discovery suggested to Dr. Klein a further question. He had shown, it was thought, that the Cow Disease could set up Scarlatina in the human subject he would now find out whether the Scarlatina germ was capable of producing the Cow Disease.

From a number of patients in the Fulham Fever Hospital, states the *St. James's Gazette* Dr. Klein took minute quantities of blood. These were placed in tiny tubes, and transferred to the surface of nutritive gelatine. In the result he obtained clear evidence that in some of his experiments the blood contained organisms. In other cases no positive results whatever were obtained. But in four cases out of nine the specific organism was detected; and the organism so recovered from the blood of Scarlatina patients was found to be exactly the same as had been cultivated from the virus taken from the teats of the Hendon cows. Dr. Klein does not hesitate to name this organism the *micrococcus scarlatinæ*, as having a special character and a definite mode of existence. The next question was whether, itself capable of being cultivated from the Cow Disease, it was capable of being transformed back into the virus of that disease.

With a subculture of *micrococcus scarlatinæ*, derived from Scarlet Fever in a human being, Dr. Klein inoculated two calves. The first was killed after ten days, and from blood taken from it a growth was derived identical with the *micrococcus scarlatinæ*. The second calf was killed after twenty days, with the same results. In both animals an identical disease had been produced. Subsequently two calves were fed with milk mixed with the growth from several tubes of the same date and the same source as used for the other calves; and again the identical disease was produced: this disease bearing a great resemblance to that observed in the Hendon cows, except that there was no affection of the skin. But three out of four other calves—two of which were inoculated and two fed—were differently affected. Sore patches appeared, and the skin became scurfy; and on each nostril of one of them there was a patch of eruption which decided the matter. From these skin-eruptions were obtained "beautiful chains of cocci," coinciding with those developed from the virus of the cows. The circle was thus complete. A Cow Disease which is not Scarlatina, nor anything like Scarlatina, causes the animal to have sore teats. The exudations find their way into the milk-pail, and there develop into something which infects human beings with Scarlatina. From the Scarlet Fever patient a few drops of blood are taken; and after the disease germ has been cultivated, it is passed into the system of a calf, which forthwith becomes attacked by the identical disease observed in the original cow.

But this is not all. A case of suspected condensed milk was brought under Dr. Klein's notice. Scarlatina had broken out and could be traced to no other source. Sure enough the *micrococcus scarlatinæ* was found in the

milk, and experiments with it on animals yielded exactly the same results as before. Again, last January a monkey died at Wimbledon of Scarlatina contracted by drinking the milk of cows among which there prevailed a disease similar to that at the Hendon farm. Microscopic examination of the internal organs of the monkey revealed the same changes as occur in these organs in human Scarlatina, and in the blood the Scarlatina micrococcus was found. By means of this micrococcus the Hendon disease was again induced in animals. Dr. Klein may therefore claim, says the *St. James's Gazette*, to have discovered a hitherto unsuspected cause of Scarlatina, in the form of a little-noticed and less understood Cow Disease quite distinct from the dreaded malady which—after certain developments of its germ—it produces in man.

RABIES AND HYDROPHOBIA.

SUMMARY OF EVIDENCE TAKEN BY THE SELECT COMMITTEE OF THE HOUSE OF LORDS, BY JAMES LAMBERT, F.R.C.V.S., INSPECTING VETERINARY SURGEON, ARMY VETERINARY DEPARTMENT.

(*Continued from page* 355, *vol.* XXV.)

In order to make this paper as short as possible, repetition of evidence is omitted, except where important and contested points are involved. Any remarkable opinions are, however, given, to show what different ideas exist relating to the origin and course of disease.

Mr. Arthur Nicols, F.G.S., who gave evidence as "a naturalist and public lecturer on dogs," thinks that Rabies is not spontaneously developed. Was four years in the bush in Australia, where there is no Rabies among the dogs in a semi-wild state, although the climate is extremely warm. There the dogs were doing very hard work with cattle, frequently deprived of water for fifteen or twenty hours at a time, and sometimes compelled to drink from shallow pools, foul beyond description with the rotting carcases of sheep. Rabies is utterly unknown in Australia.

Mr. Everett Millais, "an owner of dogs," is strongly in favour of the muzzle regulation applied all over the country to prevent the spread of Rabies, and is in favour of a period of quarantine for imported dogs.

Sir Charles Warren, G.C.M.G., Chief Commissioner of the Metropolitan Police: The regulations as regards muzzling dogs were first issued in November, 1885. Agrees with Mr. Sewell that the symptoms of Rabies are different from those of Epilepsy in the final stages, but thinks that the preliminary symptoms are exactly the same, and says that veterinary surgeons cannot always distinguish them. (Professional men will perceive that Sir Charles Warren is here under considerable misapprehension as regards the differentiation of Rabies and Epilepsy by veterinary surgeons. Nothing is easier to those who have seen the two diseases.) Sir Charles Warren continues, that out of 212 dogs killed by the police last year forty-eight were rabid. The Dogs Act states that dogs must be "under control" under certain circumstances; the magistrates, however, last year differed in their first definition, but eventually came to a decision that "under control" meant muzzling or leading. Believes that the spread of Rabies was stopped by muzzling. The rule with regard to the muzzle was, that it must not be cruel, that it must allow the dog to drink, and at the same time must not allow the dog to bite. The muzzle must be of wire, as the leather muzzles are useless. Most dogs do not object to the muzzle. Our rule was that the dog should be muzzled in such a manner as to admit of the animal breathing and drinking without obstruction. Thinks general muzzling for a sufficiently long time would stamp out Rabies. The proportion of rabid animals to the total number killed by the police is always about a quarter. Thinks there is a simi-

larity between Rabies and Epilepsy at the beginning, and that a veterinary surgeon cannot tell the distinction between the two at an early stage; he cannot say whether the dog is mad or epileptic at the beginning; all veterinary surgeons say the same as that. (Sir Charles Warren is here again under an entirely wrong impression, as veterinary surgeons hold the contrary opinion.) Thinks there is much more danger of Rabies in places where dogs lead such unhealthy lives as they do in town. Thinks that if the muzzle were enforced all over the country for three months, and then kept on in boroughs there would be no danger of its spreading. Is of opinion that dogs ought to be permanently muzzled in towns where children are. The supervision of dogs by the police makes them unpopular, and is not only troublesome but dangerous, as a great many men have been bitten by mad dogs, and some of the men have had their hands covered with bites. None of the constables have, however, died from Rabies. Seven were sent over to Paris to be treated by M. Pasteur. Would have a regulation that every dog should wear a collar with the owner's name and address on it. At one time, in 1886, in the metropolitan area, 200 policeman were employed at one time enforcing the Dogs Acts; that represents nearly £20,000 a year. Thinks it would be worth while to organise a special body of men, and put them under the employment of the Metropolitan Board of Works; their duties would be connected with dogs and not with human beings. Throwing this duty on the police makes them unpopular, and injures them in their ordinary duties. Thinks that leading a dog is not safety to strangers. Thinks that there are "epidemics" of Rabies. During last year, for instance, there was an epidemic, that is to say, dogs were liable to a kind of Epilepsy, and while they were liable to Epilepsy they were also liable to develop Rabies if they were bitten by a rabid dog, and "so far as I have seen Rabies and Epilepsy go together." When there is Rabies prevalent there is also a great deal of Epilepsy. Does not in the least believe in spontaneous Rabies; merely means that dogs are more subject to Rabies at some times than others. Would make it penal to let a dog be loose without a collar. Thinks there is as much or more Rabies among pampered dogs than there is among starving dogs. When a policeman is bitten carbolic acid is put into the wound. He on being bitten goes to the nearest chemist's shop and asks for some absolute phenol to be put into the wound. During the muzzling regulations many people left London to avoid them. Would put the Rabies regulations in force if he thought Rabies existed to such an extent as to be dangerous to the public. The streets are the playground of the children of the metropolis, and to allow unmuzzled dogs there seems quite beyond reason. Many children get so frightened by dogs that the effect of the fright lasts through their lives. What is a large dog to adults is only what a small dog is to children. Thinks that certain kinds of dogs, such as collies for instance, which are treacherous, should not be allowed in densely-populated parts at all—not even if muzzled, because they may slip their muzzles. In Turkey if there was a mad dog they would kill all the dogs round, and stamp it out, without thinking anything of it.

George Fleming, C.B., LL.D., Principal Veterinary Surgeon of the Army, says: In 1872, when he published "Rabies and Hydrophobia," the evidence had not become sufficiently clear that the disease might not arise spontaneously, but now believes that it never arises spontaneously. Was a member of the Royal Commission to inquire into M. Pasteur's system. The committee was unanimous in its opinion. The best remedy for Rabies is to stamp out the malady. Advocates universal muzzling for a certain period, which might be done without any cruelty. Would only enforce the muzzle when dogs are out, and not when on the owner's premises. A dog in the streets without a muzzle should be taken as a suspected dog. Muzzles are not so much a preventive against biting as an indication that the dog has an owner.

Every dog should wear a distinctive badge attached to his collar. It would be absolutely necessary to license every dog. Thinks six months old early enough to tax a dog. Would put the longest period of incubation of Rabies at twelve months. Although he would not tax young dogs, yet the bite of a rabid puppy would be dangerous, as dangerous as that of an old dog. M. Pasteur's system should be adopted within ten days after the bite. Does not think it is reliable if more than ten days have elapsed. The susceptibility of animals to take Rabies does not appear to be influenced by climatic conditions or age, but animals in a weakly state of health seem more disposed to take it. Entirely disbelieves in all the so-called cures for Rabies; every attempt at treatment has failed. There is undoubtedly sometimes a kind of mental hydrophobia in man; persons' minds are affected by thinking of the malady, especially if they have seen a person suffering from Hydrophobia, but does not know of an authentic case where mental hydrophobia has been fatal. Dumb madness and furious madness are the same disease, and the same virus will produce both forms. A *post-mortem* examination will not tell with certainty whether a dog was mad or not, but certain conditions of the stomach, which are not at all constant, might lead one to suspect Rabies, such as the presence of foreign bodies in, and congestion of, the stomach. But by inoculation with the virus we might ascertain with certainty whether the dog was rabid; this, however, is much restricted by the vivisection regulations under which so few places are licensed for experiments. If intracranial inoculation of Rabies is employed, the period of incubation is limited to between six and twelve days. If a dog is suspected of Rabies he ought to be kept alive, because if he has it his death will soon settle the question. There are cases on record, though very few, of recoveries of dogs from Rabies. There is no well-authenticated case of the recovery of a human being from Hydrophobia; cases have been reported, but they are very doubtful. M. Pasteur does not profess to *cure* Hydrophobia when once the symptoms have developed; he only prevents the virus from acting by attacking it before it has had time to cause the disease. M. Bourrel, a French veterinarian, proposed filing off the points of the fangs of all except sporting and watch dogs, to prevent their biting. Dr. Fleming does not think pampering has anything to do with the production of the disease; the rabid dogs are usually the starved dogs of the streets, as they are more exposed to bites. Would not apply muzzling to sporting dogs, because they are usually well looked after, and, for the same reason, would exempt *bonâ-fide* shepherds' dogs. Cats and foxes get Rabies from dogs. Believes wolves in Russia get Rabies from rabid dogs. Does not think hounds tearing up a rabid fox would get the disease, as it is not communicated through the digestive organs. If a dog had a wound on his head he might get it, but it is a remote possibility. The bite of a rabid cat is as serious as that of a rabid dog. Believes Rabies is chiefly propagated by wandering dogs. Although in some years Rabies has assumed an epizootic form, does not think the season of the year has anything to do with it. Is entirely in favour of stamping out Rabies. Does not know any animal disease that could be more readily stamped out. It is a disease which owes its spread solely to inoculation, and, therefore, if you prevent dogs biting for a certain time, you must get rid of the malady. In effecting this object, inconvenience to any persons should not cause Government to hesitate. In "Rabies and Hydrophobia," published by Dr. Fleming in 1872, it was stated that there was every reason to believe that Rabies or Hydrophobia might arise without contagion. Dr. Fleming is, from information obtained since that book was published, now quite convinced that the disease never arises spontaneously. The most convincing fact of all is, perhaps, that in the Isle of Réunion Hydrophobia and Rabies have never been witnessed within the memory of man, whereas, in

the neighbouring Isle of Mauritius, Rabies prevails to an alarming extent. In the Island of Réunion no dogs are allowed to be imported; but in the Island of Mauritius dogs are imported and are allowed to run about without any care at all, and the malady prevails there sometimes to a most terrible degree. Australia is exempt from Rabies and Hydrophobia; also the Shetland Islands, the Orkney Islands, and other parts of the world where dogs are kept in exactly the same way as they are in countries where Rabies is known. Suggested in "Rabies and Hydrophobia" that the earliest symptoms of the disease should be printed on the back of the licence paper, and that system was soon after adopted in Paris, on the recommendation of Professor Bouley. As to the difference between Distemper and Rabies, there is in both diseases, at first, dulness and a desire to get into a corner, or out of the way; but then the advice of a veterinary surgeon should be sought. At no stage are Epilepsy and Rabies like each other; Epilepsy attacks the dog at once and he falls into a fit; but in Rabies the symptoms are continuous, and there are no convulsive attacks as in Epilepsy. The appearance of a dog when in an epileptic fit bears not the faintest resemblance to the symptoms of Rabies. Epilepsy in the dog is the same disease as Epilepsy in man. Outbreaks of Rabies nearly always start from towns as the centre, and extend into the country. It is so in Lancashire, Yorkshire, and Cheshire. Rabies exists pretty well all the year round in some of our large towns. Distemper does not arise spontaneously; it only arises from infection or contagion, and it is entirely a popular delusion that every dog must have Distemper, which is extremely infectious. The infection can be carried in people's clothing, in food, etc. If a person has been to a place where a dog is suffering from Distemper, and goes miles away to a kennel where there are young dogs, the risk is ten to one that he would infect them.

Mr. Benjamin Arthur Whitelegge, M.D., Medical Officer at Nottingham, said: Many cases of Rabies had recently occurred there, the greatest number being reached in December, 1886, when the muzzling order was not in force. On the 13th December the muzzling order was put in force, and there was a sudden diminution of Rabies. Whenever the muzzling order was enforced Rabies decreased, and *vice versâ*. This experiment was tried three times with the same result. Nottingham is certainly one of the districts more affected by Rabies than others in England, but not so much so as Lancashire. One of the most important parts of preventive measures is taking up dogs not under control, and slaughtering them if not claimed within a certain number of days. Nine human patients were sent to M. Pasteur from the Nottingham district, of whom none have died. In the village of Ruddington, Nottinghamshire, a rabid dog on the 18th March, 1886, bit three sheep, of which one was seized with Rabies on the 2nd April, and died. Later on in the day the same dog bit ten more sheep, and five died of Rabies; still later in the same day it bit another set of five sheep, and two of these died of Rabies; and next morning it bit twelve more sheep, two of which died of Rabies. So that altogether thirty sheep, including ewes and lambs, were bitten, of which three died from the shock of the injuries, and ten more from Rabies. In order to stamp out Rabies, universal muzzling and the destruction of stray dogs would be necessary. There are leather muzzles that are not cruel and yet effectual; these are made of stiff leather in the same shape as the wire ones. Does not believe Rabies arises spontaneously.

Mr. George R. Krehl, editor of the *Stockkeeper*, *Kennel*, and *Farrier's Chronicle*, says: Rabies in exhibitors' and breeders' kennels is very rare indeed, owing to the seclusion in which they are kept, and to their being well looked after. Dogs "out of sorts" are at once isolated. Is in favour of destroying stray dogs not owned in three days. Quarantine for imported

dogs would be little hardship, and is in favour of it. There are very few foreign breeds of dogs imported, because our own are superior. Now we have more poodles and dachshunds than are to be found in their own countries, and better dachshunds than they have in Germany. Thinks that the Viennese plan might be beneficially applied to England. That plan is a collar with the name and address of the owner on it, and a metal tally showing the dog is licensed. If a dog had not the tally on, the police would at once see the dog was not licensed. When the owner pays the tax he could have the license paper and metal tally handed to him. If means were devised for making everybody pay the dog-tax the amount received would be more than doubled.

Mr. John Atkinson, M.R.C.V.S., "a consulting veterinary surgeon," thinks from a fortnight to thirty-five days is the principal time of incubation of Rabies; the majority of cases break out in that time. When the dog shows symptoms of Rabies, he usually dies in from four to six days, believes there are one or two cases recorded of six days, but it is usually four or five days. The first symptoms of Rabies are: usually we find a peculiar dulness, the dog hides himself for the first day or two, and after that has a peculiar cast of the eye, a kind of brilliant appearance; then there is the rambling stage, in which dogs run some distance when they get out. If they can break from their owner they run for miles and then return. They have paralysis of the lower jaw in the advanced stage and there is the peculiar bark; a wiry form of saliva hangs from the mouth, and a rabid dog will at once furiously fly at a strange dog: this is one of the most marked symptoms. If you attempt to tie up the rabid dog he becomes most furious, and you therefore cannot really muzzle a rabid dog, and if you do get the muzzle on he will almost tear himself to pieces to get it off. *Post-mortem* examination does not diagnose Rabies, because dogs suffering from indigestion will eat strange things, such as sticks, stones, etc. Thinks a great number of veterinary surgeons mistake Epilepsy for Rabies in the country districts, where few cases of Rabies are seen. (Perhaps country veterinary surgeons will read this observation with some surprise.—J. L.) Witness continues: Rabies and Epilepsy do not resemble each other, yet a person who had not seen many cases might mistake them. Thinks Rabies is entirely contagious, and does not believe it occurs spontaneously. Does not believe that the muzzle has anything, or at least has more than very little, to do with the lessening of Rabies. Thinks the Vienna system of collar and badge good. Thinks Rabies would be stamped out without muzzling by stopping the importation of foreign dogs; and we might kill all mad dogs; and also those that have been bitten by a supposed mad dog we should keep isolated or kill.

Dr. William Whitmarsh, M.D., M.R.C.S., and M.R.C.P., said he has studied M. Pasteur's system, but does not know that anything whatever has been found out about the microbes. "Nothing has been proved at all by M. Pasteur, except that he does inoculate with this virus," and "I believe at the present time we are not in a position to state that inoculation has done good at all." Witness continued: Believes in the case of Rabies that the rabific matter or germ is latent in the dog's blood, and by keeping it from water, or by muzzling it, or by annoying it, or by irritating it, the rabific matter enters into a state of fermentation, and Rabies is produced. Considers that Rabies might be produced or developed by a muzzle which prevents the dog from drinking water, and from breathing freely through his mouth. Feels certain that the use of the muzzle has developed the rabific matter in the blood of the dog without his having contact with any other dog, and that it can be spontaneously developed. Hydrophobia seems to be a new disease in England. "In Vienna they hardly know what Hydrophobia is, and,

I believe, that is simply because they adopt the Registration Act, and allow the dogs plenty of water." Has been to America, and there during the hot season they never have Rabies; but it is in the winter-time when all the ponds, lakes, and fountains are frozen that they have Hydrophobia. That pretty clearly shows that it is the absence of water that tends to develop Hydrophobia. The witness was asked by the Earl of Coventry: "Do I understand you to say that you think muzzling useless as a preventive of Rabies?" Answered that it depends entirely upon the district where it is put into force, as to whether there are any mad dogs about; but taking the case of a district where there are no mad dogs I will guarantee to say, that if you put on the muzzle you will in a very short time have several cases of Rabies. The muzzle annoys the dog, irritates him, and heats his blood. Quite believes Rabies is spontaneous. Question: "Do you consider it an open question whether this particular disorder may arise spontaneously in some cases, as well as by contagion in others?" Answer: "I should *not* say it was perfectly spontaneous. I should say that the germ was in the blood, and it only needed the match to be put to the fire which was already laid for it." Question by the Earl of Kimberley: "What do you understand by a germ?" Witness: "An organic microbe organism, just the same as the anemone seafish; it is something and it is nothing; you can hardly define what it is; the lowest form of organic life; it is something in the blood which is almost indefinable, but which, if put under a microscope, is seen to be in a very minute form." Thinks that in Southern America, and in Mexico and Florida, and that part of the world, and in warm climates generally, where there is plenty of water, Rabies is very little known. "It evidently appears to be the case that it only occurs in places where dogs are deprived of water." There are three different causes of Rabies in dogs, first, being bitten by another mad dog; secondly, it is hereditary; and thirdly, it arises naturally. Small-pox comes naturally, and may come without any contact at all. Thinks that the muzzling in the metropolis has been the means of increasing Rabies.

Mr. C. Rotherham, described as "canine surgeon to Her Majesty, and Licentiate of the Royal College of Veterinary Surgeons," but who is, however, only a "Registered Practitioner," said: Has had twenty-five years' experience as a canine surgeon; thinks Rabies may be produced by inoculation, or may have a spontaneous origin: believes in Rabies being hereditary. Rabid dogs will do all they can to get a muzzle off. Every dog should be measured for its muzzle. Has had a dog mad from the bite of a rat. Thinks a muzzle is detrimental to a dog's health. Does not know of any muzzle that is humane. Would suggest that dog owners should be required by law to send for a veterinary surgeon whenever a dog is sick, under penalty for neglect. Thousands of dogs are now kept in cellars, and only come out once a week, or once a fortnight, which is particularly the case in the Black Country, in Sheffield, Birmingham, and Manchester, and in some parts of London; at Kensal Green, for instance, on Sunday mornings thousands of dogs are brought out for a walk that never see daylight otherwise. Has never known a dog live over the fifth day after the symptoms of Rabies were developed, and has known them die within two days of the appearance of the symptoms. In dogs there is a latent kind of Rabies, which is not produced by a bite or inoculation, and which is not developed unless some irritation occurs. Is aware that his opinion that Rabies may be hereditary or spontaneous is opposed by Dr. Fleming and most of the authorities. Is of opinion that the period of incubation in Rabies is from eight days to six weeks; has never had a case go over the sixth week. Remembers nine dogs being bitten by one rabid dog. They were in cages, and a fortnight was the longest period of incubation. Was himself bitten by a dog supposed to be rabid, and Mr. Kent, a veterinary surgeon then in practice, was bitten by the same dog and

died. "I recovered and I attribute my recovery to the vapour bath applied six weeks after the bite." The Earl of Miltown asked the witness, "You never had any symptoms of Hydrophobia, had you?" Answer: "I took the form of Tetanus or Lockjaw."

Mr. John Henry Clarke, M.D., said that his reading convinced him that Hydrophobia is not incurable, and quoted some cases which he described as of undoubted authority. Asked: "Do you think Hydrophobia can be produced spontaneously in men as well as in dogs?" Answered: "I do not say I think so; I only say that the evidence is not sufficient to decide the question either way." Does not think there is evidence to prove that Rabies is not spontaneous. Has not treated a case of Hydrophobia in either human beings or dogs.

Colonel E. L. Pryse, who keeps a pack of foxhounds in Cardiganshire, said Rabies at one time broke out in his kennels, some bitches having been bitten by a passing dog; hounds were being lost every day from the disease, when an old neighbouring quack doctor was called in, and the hounds were drenched with his "concoctions," and there was no loss afterwards, and not only that, but one bitch, whose jaw had half dropped by dumb madness, got perfectly well, and hunted for years afterwards. In this outbreak the dumb and raging madness appeared to break out simultaneously, some of the hounds being affected by the dumb, and some by the raging form of the malady. In the canine form of the disease there is no fear of water, and the witness has seen rabid dogs run through a river: they go and plunge their heads in water up to the eyes, but they cannot swallow. This is an important point to remember, because people sometimes say of a dog suspected to be mad, "That dog cannot be mad, because it runs through the river." Has hunted for nearly seventy years everywhere in Cardiganshire, and has never heard or known of a rabid fox. The only authentic instance is that of a tame fox which bit one of the Dukes of Richmond, some years ago, who died from the bite. (Lord Doneraile died this year, 1887, of hydrophobia caused by the bite of a tame rabid fox). The great body of the decoction above alluded to as having cured the hounds, is the thing which any one may see in any old rotten bank; it is called by a Welsh name which is equivalent to "ground ear." It is a strong fungus with an intensely pungent smell. Other things were mixed with it. The hounds had an emetic three days running, and the third day were drenched with the decoction, a considerable quantity of cold bathing going on at the same time. The kennel-man administered the treatment, being protected by an old coat of chain armour, and three or four pairs of gloves. This occurred nearly fifty years ago. Witness has never known a case of spontaneous Rabies. Witness thinks that many veterinary inspectors do not know a mad dog from a sane one. The old quack doctor kept his remedy a secret until he died, and then Colonel Pryse (the witness) got it from his son and advertised it in *Land and Water* or in the *Field* a few years ago, but never got any application for it.

Mr. W. Hunting, F.R.C.V.S., said: Contagion is the only cause of Rabies. Has never seen a rabid dog live over five days from the first exhibition of any change in his manner or behaviour of a suspicious nature. A rabid dog has always a fancy to roam immediately, and always escapes when he can. His experience is, that it is twenty to one that it is the best-kept dogs that spread Rabies. One breed of dogs is not more liable to Rabies than another. Snapping is very often the first symptom of Rabies. Does not think that muzzling had so much effect itself in stopping Rabies in London as its calling the attention of people to the condition of their dogs. Agrees with the opinion that if muzzling were generally carried out all over the country, for a little longer time, however, than a year—the period given by some witnesses—Rabies would be stamped out.

Sir Algernon E. West, K.C.B., Chairman of the Inland Revenue Board, gave evidence as to the collection of the dog tax, and said, in conclusion, that to print a short account of the usual symptoms of Rabies on the back of the dog license would be quite simple and inexpensive.

The Chevalier F. Krapf de Liverhoff, Consul-General for Austria in London, said he would get information for the Committee concerning the dog regulations in Austria.

Colonel Cobbe, Crown Inspector for the Midland Districts, which comprises a third of England, gave evidence relating to police duties connected with dogs.

Professor J. Woodroffe Hill, F.R.C.V.S., thinks that Rabies sometimes arises spontaneously, and has found that in-and-in bred dogs are much more subject to Rabies then other dogs. Has had several instances of spontaneous Rabies. Is much astounded to find Dr. Fleming does not now believe that Rabies arises spontaneously. Thinks it would be perfectly absurd to try and stamp out Rabies by muzzling. Rabies occurs in ferrets. Has never known of a case of a rabid fox. Is quite sure that the chief outbreaks in this country have been amongst foxhounds; they have been the great centres of it, and further says that Rabies is more prevalent among foxhounds than among other breeds of dogs. Asked whether this opinion is not a guess on his part, the witness answered that he could not admit that. Does not believe that the deer in the late outbreak in Richmond Park were rabid; believes they suffered from Splenic Apoplexy, in which the nervous system is affected in much the same way as in Rabies; for instance, in splenetic disease there is paralysis, delirium, and congested brain, and the condition of the spinal cord, with other morbid conditions, all exactly as you see them in Rabies. Does not believe that M. Pasteur can get protective lymph from the brain and spinal cord, and is not prepared to admit the Pasteur theory of inoculating. Would consider the maximum period of incubation of Rabies to be twelve months. Would be very sorry to make experiments on rabbits, as he is not a vivisectionist. Has made no experiments regarding M. Pasteur's system. Considers that in-and-in breeding predisposes the dog to take Rabies, and thinks that, taking packs altogether, hounds are more in-bred than other dogs. If Rabies is a spontaneous disease we can only stamp it out by exterminating the whole race, and muzzling cannot stop it; the muzzle would render the dog so irritable and dangerous, that the evil would be almost as great as the other one. Believes that a savage dog, like a savage cat, can give a very venomous wound, but does not admit that the bite of a dog in a bad temper, or very much annoyed or excited, is poisonous—at any rate to such an extent as to produce Hydrophobia. Thinks he has seen every muzzle that has been invented, but has failed to see a safe one in the form of a wire muzzle, and in his view there is no protection whatever from the muzzle. Heat has nothing to do with generating Rabies; if it had, we should have had it in Australia and South Australia long ago. The witness was asked by the Earl of Kimberley, "If Rabies is spontaneous now, can you account for its never having appeared in these countries?" Answer: "Because dogs are not in-bred there as they are in England, as I said in writing to the Australians some time ago upon the subject. That is a very great point."

Mr. Richard John Price, a breeder and owner of dogs, attends a great many dog shows, and judges and exhibits at them; is deputy-lieutenant for Merionethshire. His favourite dogs—pointers—are very liable to Rabies. In packs of foxhounds puppies and skirting hounds—*i.e.*, a hound that leaves the pack during hunting—are most likely to bring Rabies, the former from returning to the places where they have been "at walk," and where they may be bitten by other dogs. Collies are particularly liable to spread infection,

because the collie has a habit of roaming at night, leaving his home and going out to kill sheep. Two stray collies came into one of his coverts and killed nearly 250 young pheasants and forty-nine old hens. They came at night, wandering in search of food or prey. You never see a farmer's sheep killed by his neighbours' dogs; it is always by a marauding dog from a long distance. This occurs in Wales. Thinks that collie dogs frequently go out at night to kill sheep, but still a collie dog is as necessary to a farmer as a spade is. By collie "I mean sheep dogs." Does not think wire muzzles are good, because dogs can still bite, or at least scratch animals through them with their teeth. Thinks the only effectual muzzle is the old-fashioned thin leather strap one, but considers it cruel. Thinks that the wearing of the certified collar with metal badge would be more effectual than the muzzle in combating Rabies in wild and thinly-populated country districts; farmers would be more likely to use that than the muzzle. Thinks that Rabies arises sometimes spontaneously.

Mr. John Colam, Secretary of the Royal Society for the Prevention of Cruelty to Animals, and a member of the Committee of the Dogs' Home, said that, as regards the Dogs' Home, there is an agreement with the Commissioner of Police as to keeping stray dogs, their registration at the Home, restoration to owners, etc. Stray dogs captured by the police are sent there, and are kept for five days. The Act provides for three days, but in obedience to a request of the Queen, they are kept two days longer. The pens are all open to the inspection of the public. Dogs ordered to be destroyed at the Home are put into a lethal chamber, where, under the influence of carbonic oxide gas, they immediately pass into a sleep, and die without apprehension of death or pain. Any suspected dog brought to the Home is isolated, and examined once every day by a veterinary surgeon, and if rabid, destroyed with all other dogs that came with it. A veterinary surgeon examines all dogs daily. Inquiries show that a lasso is more used in Europe for catching stray dogs than anything else. Thinks that in London the muzzle may have contributed to the decrease, but it was the capture of stray dogs that mainly brought about the reduction. 25,000 stray dogs were sent to the Dogs' Home at Battersea in 1885, and in 1886 nearly 35,000, all from the metropolitan area. During the panic about Rabies, people paid more attention to their dogs, and on noticing peculiarities, consulted veterinary surgeons Muzzles may assist in some way, perhaps, but they cannot exterminate Rabies. In Berlin, the muzzle goes hand in hand with registration and census, and the wearing of a collar and regulation tally. Thinks the muzzle not of much use as a preventive of Rabies, and quotes numerous continental veterinarians in support of his opinion. Although in 1885 and 1886 the police brought nearly 61,000 dogs to the Home, no man—and very many policemen were bitten—was attacked by Hydrophobia. From this, thinks that the danger of taking the disease is exaggerated. Pavitt, the head-keeper at the Home for twenty-five years, said that he had been bitten thousands of times without bad consequences, and he was cauterised only a few times. All the other keepers say that they have been bitten many times without any bad consequence, and not one has suffered from Hydrophobia. Witness, however, recommends taking adequate measures against the spread of the disease, and does not think that any possible inconvenience to dogs or dog-owners ought to stand in the way of applying any remedy which might be found to be effectual against the spread of Hydrophobia. Thinks that the tax on dogs in towns should be higher than that in the country, because a town is not the place for dogs—collies, for instance—and people should be discouraged from keeping their dogs in a crowded town.

Dr. T. Lauder Brunton, F.R.S., M.D., one of the members of the Pasteur Commission, does not believe that Rabies arises spontaneously, or that there

is any reason to suppose that it is hereditary. Does not believe that Rabies can be given except by inoculation, or, in other words, unless the poison is introduced into an animal's body by a scratch, bite, etc. Narrates a case in his own practice where a young lady became affected with Hydrophobia three weeks after being bitten by a rabid dog. Inoculated his finger in making a *post-mortem* examination of a case of Hydrophobia, but only discovered that he had done so next morning, and cauterised the part so severely by permanganate of potash and caustic potash as to lose the top of the finger. Had no bad symptom afterwards. Saw one case of a boy bitten in the face. He was within five minutes well cauterised with nitrate of silver by a surgeon, yet he died of Hydrophobia in six weeks afterwards. The proportion of cases of Hydrophobia to the total of bites upon the face is very large. We have a number of cases on record where the simple application of the saliva of the rabid dog has communicated the disease. The members of the Pasteur Commission were quite unanimous in their report. Witness went over to Paris feeling very incredulous about the utility of the Pasteur system, and came back convinced of its utility. Thinks that a spinal cord would keep good for purposes of experimentation for several weeks—perhaps months, if kept at a moderately low temperature in glycerine.

Mr. James Rowe, M.R.C.V.S., President of the Central Veterinary Medical Society of London, regards the collar and badge as in no way desirable, and considers the muzzle a very inefficient measure. Thinks that if a veterinary surgeon is called upon to examine a dog on the ground of its having been mad, a *post-mortem* examination should be obligatory. Does not think the muzzle would have the least effect in putting down Rabies. The best preventives would be the better enforcement of the dog license, and a system of seizing stray dogs, and is in favour of the registration of dogs.

Mr. William South, F.R.C.V.S., is of opinion that Rabies is a "contagious spontaneous disease, originating and indigenous to this climate." There may be hereditary predisposition, and it will arise from diseases of the stomach or anything of that description which will upset the nervous system. Believes that Hydrophobia may be communicated by a dog or other animal that has not itself been bitten; believes that the saliva of the dog is poisonous in many cases. Has known a dog go mad when taken away from a bitch. Then the inclement weather affects dogs; you will notice that Rabies is most prevalent in winter or bad weather, when the wind is in the east, and the weather is wet and cold. Rabies is indigenous to this soil, and whatever you do you will never get rid of it. Believes that chaining up a dog may cause Rabies by preying on its mind and producing a great amount of irritability. Thinks the muzzle useless, and that it is an aggravating cause of Rabies.

Dr. Bell Taylor, M.D., F.R.C.S.L. and E., does not think we know what Rabies is, and that the whole class of canine nervous diseases may be mistaken for Rabies. Thinks M. Pasteur's system a great delusion.

Mr. Thomas Michael Dolan, M.D., L.R.C.P.E., F.R.C.S., is author of a book on "The Nature and Treatment of Rabies or Hydrophobia." This work was written by Dr. Geo. Fleming, P.V.S., and himself, the former doing the part referring to animals, and witness that relating to mankind. Would impose a penalty on owners of dogs neglecting to pay attention to first symptoms of Rabies. Does not think Rabies arises spontaneously; it must come from inoculation of some sort. Believes universal muzzling would be effectual in stamping out Rabies. Brouardel estimates the annual mortality in man in France from Hydrophobia at thirty. Tardieu, the acknowledged first hygienist in France, at twenty-five. M. Bouley accepted the averages given by Brouardel and Tardieu, and took it as from twenty-five to thirty. A certain number of cases of undoubted Hydrophobia have recovered. Witness thinks that the evidence in favour of the Pasteur system is, so far, unsatisfactory and in-

sufficient. Witness approves of muzzling and registration to combat Rabies.

Surgeon-General Charles Alexander Gordon, M.D., C.B., Q.H.P., thinks that Rabies as a specific and distinct disease does not exist. Thinks that Hydrophobia in man may follow from the bite of a dog, as it does any other injury, from the scratch of a nail for instance. Question: "Do you think that if for instance, you broke your leg you might take Hydrophobia in consequence?" Answer: "Yes, bearing in mind the view I take that Hydrophobia is not a specific disease."

Mr. Charles Lennox Peel, C.B., Clerk of the Privy Council, gave evidence on the different ways of administering Acts relating to Rabies. He was the last witness called by the Committee.

Briefly stated, the Committee after hearing all the foregoing evidence came to the following conclusions, set forth in their Report:—

1.—Expresses a hope that M. Pasteur's system will prove to be a success.

2.—That though it cannot be absolutely demonstrated that Rabies does not arise spontaneously, yet it is practically proved that inoculation with its virus is the only ascertained means of imparting the disease. This is, of course, equivalent to saying that the Committee does not think it arises spontaneously.

3.—That climatic conditions have no effect in producing or increasing the malady, and that in the hottest and coldest regions it is absent, and it has been shown that no special treatment of dogs, however trying to them, can bring about this particular affection. For all practical purposes, therefore, it may be dealt with as transmitted by inoculation only.

5.—Says that percentage of cases of Hydrophobia in those persons bitten by really rabid dogs is by no means large. Though the effect of immediate cauterisation is doubted by some, yet it should be adopted as soon as possible, and the methods most recommended are the hot iron, and strong carbolic acid. Panic is to be deprecated, because so many bitten persons escape.

6.—Strongly recommends that every dog license should have "an endorsement of the early signs of Rabies upon it."

7.—Does not agree with the suggestion that dogs with the premonitory symptoms of Rabies should be handed over to the police, and by them to a veterinary surgeon, owing to the paucity of these officials in country districts, and the cost to the ratepayers.

8.—Thinks universal muzzling would be very difficult to enforce, although the evidence in favour of it is extremely strong. The Committee, however, is of opinion that the effect of muzzling dogs in London was very beneficial. Some people, however, do not consider that the muzzle was the effective instrument, but that the seizure, detention, and destruction of stray dogs, and the greater care of dog-owners under pressure, were of no little avail in bringing about the diminution of the disorder.

9.—In 1853, owing to numerous cases of Rabies, muzzling was enforced in Berlin with, in the succeeding years, varying success. In 1875 a law was passed, extending to the whole of Prussia, providing for the immediate slaughter of all suspected dogs; also all *animals* that had been bitten by rabid animals; and that all dogs in a district infected by Rabies should be confined, or, when abroad, both muzzled and led. To this law is attributed the extinction of Rabies in Berlin, no case having occurred there since 1883.

10.—More effective powers for the seizure and slaughter of stray dogs are desirable.

11.—The Privy Council should intervene where Local Authorities are apathetic, and in all cases where Rabies is present the use of the muzzle should be enforced.

12.—The Privy Council should be empowered to seize, and, if advisable, slaughter, unclaimed dogs, after three days' detention. A penalty is now enforced for concealment of cases of Rabies, and Local Authorities are bound at once to communicate to the Privy Council every instance of it brought to their knowledge. The law in these cases should be strictly enforced.

13.—The dog tax should be enforced and collected by the Local Authorities, and they should be charged with the duty of seizure, and, in case of necessity, of slaughter. The carrying of a metal badge attached to his collar would show whether a dog is licensed or not.

14.—The Committee does not recommend the registration of dogs, which could not be properly effected without a complete change of the law, as licenses are now granted to the owner for the number of dogs desired, and not for any particular dogs.

15.—Local Authorities should have power to order the use of badges in their districts. In dense populations—in towns—special regulations for dogs are required, quite irrespective of the danger of Rabies, to protect the inhabitants, and especially the children, whose playground is the streets. If very stringent measures were authorised and taken against all wandering dogs with no mark by which their owners could at once be found, they would probably lead to a general voluntary use of collars and badges.

16.—The Committee do not see how the police can be dispensed with in dealing with stray dogs.

17.—The Committee is satisfied that though cats and tame foxes may have occasionally done mischief, it sees no ground for believing that *wild ones* have ever in this country communicated Rabies to mankind, or the animals under his charge. If Rabies were stamped out, the Committee believes that there is little cause for apprehension of its reintroduction by other animals, carnivorous or herbivorous.

18.—Recommends that a suspected dog which has bitten any one should be isolated, and not at once killed, until it is decided by a person skilled in canine diseases what should be done with it. If the dog has already been killed, the spinal cord should be extracted by a veterinary surgeon, and sent, after employing preservative means, to the Brown Institute.

19.—Does not recommend the blunting of dogs' teeth, though it may be painlessly and usefully applied in certain cases.

Clauses 20, 21, 22, 23, 24, and 25 explain existing laws relating to dogs and other animals.

Clause 26.—That the Privy Council may some time be called upon by the public to exert its authority throughout the kingdom, but until this necessity arises, it seems prudent to leave to Local Authorities the initiation of necessary measures.

Clause 27 and last.—"The recommendations of your Committee may be recapitulated as follows: 1. That when Rabies is present the muzzle should be enforced. 2. That the power of the Privy Council should be extended to authorise the slaughter of stray dogs. 3. That the symptoms of Rabies should be endorsed on dog licenses. 4. That Local Authorities should have power to order that dogs should wear badges which may identify their owners. 5. That in populous places Local Authorities should place restrictions upon dogs generally, and especially deal stringently with apparently ownerless dogs in their districts. 6. That in the event of its being conclusively proved that M. Pasteur's system provides a preventive remedy, facilities should be afforded for its application in England."

INOCULATION FOR CONTAGIOUS PLEURO-PNEUMONIA.

PROTECTIVE inoculation for this troublesome disease has caused much discussion of late, and has given rise to such diversity of opinion, that we appear to be almost as far as ever from a decision as to its value, or as to the occasions when it should be practised. The following correspondence speaks for itself. The first letter is from the clerk to the Dundee Commissioners of Police, and the second from the veterinary inspector for that burgh :—

Dundee, 7th July, 1887.

Pleuro-pneumonia.

DEAR SIR,—Having regard to what passed at the recent meeting of the Sanitary Committee of the Police Commissioners, at which you were present, will you be so good as send me a report explaining (1) your proper plan of inoculation and its merits; (2) how you think the Local Authority could carry it out, with special reference to the disposal of the milk of the cows inoculated and otherwise; and (3) any other suggestions which may occur to you in regard to outbreaks of Pleuro-pneumonia.—Yours faithfully, T. THORNTON, *Clerk.*

Inspector Spreull, Yeaman Shore.

Yeaman Shore, Dundee, 12th July, 1887.

To the Honourable the Commissioners of Police for the Burgh of Dundee.

GENTLEMEN,—In compliance with the wish expressed at the meeting of the Sanitary Committee, on the evening of Tuesday last, 5th inst., and in conformity with the terms of a letter forwarded to me on your behalf by Mr. Thornton, I have much pleasure in submitting the following report for your consideration on the subject of contagious Pleuro-pneumonia in cattle.

In doing so I may say that I will confine my remarks strictly to the points raised in the letter received through your clerk, but should any member of the commission desire further explanation on the subject, I shall be only too glad to supply him with whatever information I am in possession of, either in elucidation of any point on which I am about to touch, or in the amplification of the whole subject.

I. "As to the proposed plan of inoculation and its merits."

In making preparation for the operation of inoculation, the first and most important consideration is to find a suitable diseased lung from which to select the virus; then the selection must be very carefully made, and, when it has been made, the lymph must be used within a limited time, while yet it is perfectly fresh and free from the development of putrifactive germs, which very speedily make their advent therein, in order to ensure the undoubted success of the operation.

The mode of performing the operation I need not describe in detail, as that is a matter of no consequence so far as the terms of this report are concerned. Suffice it to say that the tip of the tail is the part operated upon for a variety of very cogent reasons; but, first and principally, because this is the most convenient place; and, secondly, because, in the event of the inoculation taking too great an effect and threatening to extend to the vital structures above, all that is necessary in order to completely control and restrict its action is to resort to the simple but effective means of amputation of the part involved so soon as the inoculation has come to maturity, which usually occurs from a fortnight to three weeks, or occasionally as late as close upon a month, after the operation.

As to the merits of the operation after it has been done, I consider myself quite within the mark when I state with the utmost confidence that it will save not less than 99 per cent. of all animals that are inoculated in a healthy state, and render them perfectly proof against the disease. Not only are they

rendered incapable of taking the disease themselves, but they are equally incapable of transmitting it to others with which they may be afterwards brought into contact, as has been again and again exemplified within my own personal experience and in this immediate neighbourhood.

The following statistical summary of facts may, however, serve to illustrate the merits of the system better than any mere verbal explanation that I could possibly give:—

Outbreak.	Number of Inoculations (without selection).	Killed Diseased (after the operation).	Remaining Healthy.
A	44	1	43
B	12	0	12
C	7	0	7
D	6	0	6
E	3	0	3
F	17	1	16
G	72	6	66
H	3	1	2
I	48	1	47
J	49	0	49
K	2	0	2
L	20	0	20
M	8	1	7
N	72	5	67
O	2	0	2
P	3	0	3
Q	12	0	12
Totals	380 inoculations.	16 killed diseased.	364 remaining healthy.

Figures like these, when resulting from the indiscriminate adoption of inoculation, speak for themselves, more especially when it is borne in mind that the loss after inoculation can be reduced, without serious difficulty, to not more than half the proportion by the careful elimination of all suspected cases before going on with the operation, and by performing it only on such as are believed to be thoroughly healthy animals; and when it is further remembered that in each and all of the above-mentioned outbreaks the disease disappeared as completely as if the *pole-axe* had been at work as soon as the inoculation had time to come to maturity and take effect on the system of the animal. In proof of what I have just stated, it is only necessary to mention that all the cases in which the disease made its appearance after inoculation had been practised did so within sixteen days of that date, thus most conclusively demonstrating that the disease must have existed in a latent form prior to the date of the operation. One only of all the above-mentioned cases was lost as a result of the inoculation itself, and as this was the solitary example of a healthy animal lost out of all the hundreds I have quoted, it is only fair to conclude that if perfectly healthy animals alone were to be operated upon, the loss as a result of the operation would not exceed the modest sum of from three to five per theusand. Still further, however, in order to satisfy those who may be inclined to doubt, notwithstanding what I have already said, I may mention that in outbreak (F) only three of the animals were at first inoculated in order to test its value, and the result was that the disease continued to pick off one here and one there amongst the uninoculated animals, while these three continued to take their food and give their milk as usual, just as if nothing remarkable had happened to them, and innocent of how death was thinning out the ranks of their companions all round. Finding ultimately that they would not die, and as it now became apparent

to the owner that if he was to save any of the others, it would be necessary to resort to similar means to protect them, the remaining fourteen animals were accordingly operated upon, but within a few days one of them succumbed, leaving, however, thirteen sound and healthy animals, besides the first three, which all stood out to the end, and were alive and well when I saw them last, just before the place was declared to be free from disease.

My experience in outbreaks (I) and (J) were, if possible, of even a more satisfactory character.

In (I), only one case failed to become protected out of a herd of forty-eight animals which were subjected to the operation. This stock, like the last-mentioned one (F), were not all put under the operation at the same time, but were inoculated in two lots, as one half of the cattle were kept in a separate part of the steading, and at a considerable distance from the byre in which the outbreak of the disease had occurred. One of the first lot operated upon succumbed soon after the operation, and the disease disappeared for some weeks. When, however, this state of matters had gone on to about the sixth week, the disease, as usual, without any extraneous aid, found out for itself that there were still a number of unprotected animals within reach of its baneful influence, and, without more ado, selected its victim. So soon however, as this occurred, the owner, being quite alive to the situation, caused all the remaining cattle to be inoculated without further delay, and from that day the disease completely disappeared.

In outbreak (J), as in the cases of (F) and (I), the stock were not all inoculated at once. The first lot operated upon here being a lot of fourteen milch cows, amongst which the disease had made its appearance. There was, however, a lot of eight fat ones left undone, which stood at the opposite end of a very long byre from the stall in which the diseased cow had been; and as they were partially separated by a wooden partition, had never been actually in contact with the others, and were meant to be killed off without delay, the owner thought them quite safe, and that it was unnecessary to touch them. After a few weeks had elapsed, the whole of the fourteen inoculated animals had quite got over their operation, and were sound and healthy; but as suitable arrangements for the slaughter of the eight fat ones could not be made so soon as expected, they still remained in their stalls, with the result that, as in the other instances quoted, the disease found that they were still unprotected, and five of them out of the eight were found to be diseased, and had to be slaughtered in consequence, while three of them only remained healthy, till they were all killed by arrangement with the owner about six weeks after the outbreak of the disease. The remaining cattle in the adjoining courts were now inoculated, as it was perfectly evident that the disease would soon have extended to them, the result being that the whole of them did well, and, including the fourteen cows which were at first operated upon, the whole forty-nine animals were in good health, and several of them ready for the butcher when the declaration of freedom from disease was made.

On the other hand, in the case of outbreak (G), where all the animals were inoculated as soon as the disease made its appearance, the whole six cases that had to be killed in consequence of disease, occurred within sixteen days after the operation; the same thing may be said in regard to outbreak (N), but here only about ten days elapsed before all the diseased animals had been weeded out, and no further cases occurred, except that one of this herd succumbed to the effects of the operation. The same remarks, in fact, apply about equally to all the other cases; it is therefore surely unnecessary for me to multiply instances, or to enter into further detail as to the merits of the operation of inoculation in this disease. Suffice it for me to say that, without exception, the cattle on each of the above-mentioned premises were

mixed with fresh stock on the expiration of the prescribed period of fifty-six days, and up to the present time not a single case of disease has resulted from doing so; moreover, where the inoculated animals have been sold to the butcher and killed, there has not, so far as I have been able to learn, been a single instance in which there has been the *least suspicion* of the disease on making a *post-mortem* examination.

II. "How you think the Local Authority could carry it out?" Inoculation can only be carried out with the consent of the owner, as there is no power to enforce it; but as it is equally to the interest of the Local Authority and the owner to adopt it, and as there are no special provisions in the Contagious Diseases (Animals) Acts or Orders of Council to prevent it, it is rare that any objection will be made to the carrying out of the operation.

III. "With special reference to the disposal of the milk of the cows inoculated and otherwise." One of the first signs of disease or systematic disturbance of any kind that attracts the attention of the attendants on, or owners of milch cows, is the cessation of the lacteal supply, and in no case is this more marked than in the disease of which I am now speaking; yet, while that is so, it is nothing unusual for us to be told that the animal in question "gave her milk, ate her food, and was chewing her cud on the morning of the day on which she was observed to be taken ill," and on which also she was most likely killed by the butcher; while the *post-mortem* examination reveals to us a state of things which it is impossible to conceive could have come about in a period short of weeks, or even months of illness. Of course, during all this time the milk has been given it has also been mixed with the product of the neighbouring cows, and sold without the slightest suspicion being attached to it. Now, if the milk of such animals can be sold and used with impunity and prove itself perfectly innocuous, it must be infinitely safer to use that drawn from a cow which has been the subject of inoculation, as, if there be anything of a deleterious nature in the milk in either case, it must admittedly be much more likely to be present in the case of the animal which has contracted the disease in the ordinary way, where the amount of systemic disturbance is greatest, and where the development of the disease products is much more aggravated than in inoculated cases. Not only is the contagium of the disease present in such cases in considerably larger quantities, but it is located in much more vital structures, and in addition to retarding and interfering with the proper purification of the blood from its mere mechanical presence, it is also there in a much more subtle, ready-communicable and active form, ready to be and is freely given off in the breath from the substance of the lungs. While that is so in regard to the case of disease with which from time to time we have to deal, on the other hand the cases in which inoculation has produced the development of the disease, display none of the dangerous distinguishing characteristics of which I have just spoken, the action of the virus of the disease being strictly confined to the immediate surroundings of the point of its insertion, and though it regularly develops sufficient energy to produce such an effect upon the system of the animal as to render it incapable of contracting the disease itself thereafter– which is really all that is wanted from the operation—yet, either from the nature of the structure in which it has developed, or from the fact that it is not brought into contact with the atmosphere in the same way or to the same extent as it does when located in the lungs, or from some other unknown cause, it becomes emasculated and loses all its more virulent qualities, and can only be again propagated by such direct means as re-inoculation. As a plant will not grow and come to its characteristic maturity without a suitable soil and other favourable conditions, so in like manner the germs of this disease will not

develop their characteristic effects when a suitable medium for that development is not forthcoming, and as the suitability of the medium in the case of the human species does not exist, therefore no such disease as contagious Pleuro-pneumonia can develop itself therein. I do not, therefore, know that there need be the slightest hesitation to use, or allow the milk of inoculated animals to be used,as it is a well-known fact that Pleuro-pneumonia is essentially a disease of the ruminantia, and has hitherto proved itself quite incapable of development in any other section of the animal kingdom. It is equally well known that if you sow oats you cannot reap barley, and so in like manner the diseases of the zymotic or contagious class produce and reproduce solely and only their own special kind, whether they have been introduced by inoculation into the system of the animal or otherwise.

Supposing even that it were possible for this disease to develop itself in our systems, the connecting links necessary therefor are wanting. The virus or active contagium of this disease can only be found in a mature state in the substance of the diseased lungs or in the tissues of the part surrounding the point of inoculation, nothing more than the immature microbes, or even still more probably, only the emanations from their minute bodies, being present in the blood and the milk, or in any other part of the system of the animal; it therefore follows, as a natural corollary, that as we cannot grow grain from unripe seed, or if we do not give it suitable soil and other favourable conditions, so in like manner there is no danger of the development of this disease from using the milk of Pleuro-pneumonia inoculated cows, as neither of these essential conditions for its inception and growth are available.

If practical proof be of any value to our contention, then that also is not wanting in support of it, as notwithstanding that the milk of hundreds of inoculated animals in this and the surrounding district has been consumed—a great proportion of it by infants, who would be specially susceptible to any sinister influence it might contain—no such thing as a case of contagious Pleuro-pneumonia amongst them has ever yet been heard of. Laying the milk question aside, however, it is not a matter of very great importance, in the consideration of the causes, Inoculation *v.* Stamping-out, whether the milk should or should not be used; and if it please the Local Authority best so to order that there be a period fixed during which its use must be discontinued, in order that there may not even be the suspicion of any harm attachable to so important a food product of the people—more especially of the rising generation—then by all means let the milk be sacrificed without hesitation, and debased, if I may so term it, strictly to such uses and purposes as those for which alone nature provided the supply.

IV. As to "any other suggestions which may occur to you in regard to outbreaks or Pleuro-pneumonia."

One such suggestion occurs to me on the subject under discussion, which is probably worth mentioning here, and is as follows: Till the veterinary profession has gained more experience, and has become more uniform in its belief in the efficiency of inoculation—till our authorities have instituted some satisfactory experimental inquiry into the matter, and have come to a favourable conclusion—and till the public at large are more enlightened on the subject, and have gained sufficient confidence that the very best thing is being done for its extirpation—it might be well to impose restrictions on all cattle which have been exposed to the infection of Pleuro-pneumonia, and have been inoculated therefore, for a period of not less than twelve months, or for life even, if that should prove more acceptable, and make it illegal to move them from the place in which they are kept, except for immediate slaughter. Were some such measure as this adopted, it would entirely disarm the opposition to inoculation, as it would no longer be possible for our

opponents to contend that there was a probability of the inoculated animals propagating and spreading the disease, as they would never come into contact with any others except those in the same byre, and under similar circumstances to themselves, and would never again be moved therefrom, except when about to be slaughtered.

It is also highly desirable that powers should be obtained for the authorities of this burgh similar to those contained in Orders of Council (447), Edinburgh (449), Glasgow, and (450) Leith, by which the Local Authorities of these cities can, when occasion demands, remove diseased, suspected, or even healthy animals from premises in which it may be either highly impracticable or absolutely impossible, for want of the necessary accommodation, to kill them, as provided for by the terms of the Acts and other Orders of Council. Without some such powers, it is quite impossible for your officials to administer and carry out efficiently the working provisions of these Acts. I trust, therefore, that powers of this kind will be got without further delay.—Humbly reported by your obedient servant,

ANDW. SPREULL, F.R.C.V.S.,
Veterinary Inspector for the Burgh of Dundee.

NOTES ON A PROFESSIONAL VISIT TO THE CONTINENT.

FROM VETERINARY SURGEON FIRST CLASS F. DUCK, A.V.D., AND VETERINARY SURGEON FIRST CLASS F. SMITH, A.V.D.

(*The following notes may be of interest to many readers of the* VETERINARY JOURNAL.)

SIR,—We have the honour to submit for your information a report on professional matters which came under our observation during a recent visit to France, Germany, and Belgium.

Infirmary Stables—French Army.—We saw at the Ecole Militaire in Paris the pharmacy and forge. Many surgical instruments were shown us; one a spraying apparatus for wounds, worked by a pair of bellows; a good case of firing irons heated by petroleum; a hand pump worked by a wheel for douche or enemata; a large and complete case of surgical instruments, and a *post-mortem* case, which appeared unnecessarily bulky—these are supplied to each regiment by Government. There was also a new instrument; for expanding the heels. The supply of medicine appeared liberal. The case-book was something like our own, but there was a space of four lines left between each entry, and nothing more appears to be inserted for the treatment than can be got into the four lines under this head. The name of each horse is inserted in the register, and every animal has a book corresponding to a veterinary history sheet. Glancing down the column of treatment, drugs would appear to play an important part. We saw a tooth chisel of ingenious construction, calculated to save much labour with the tooth-rasp. In the shoeing forge we noticed that the bellows were iron cylinders; the shoes hand-made, eight nail holes, and all stamped around the toe. Their system of shoeing struck us as being old-fashioned; there was not that conservation of the foot to which we attach so much importance, nor do they appear to take much care in fitting the shoe to the foot. The old rose-headed nail was used. In passing through the sick lines, we noticed how blemished the paralysis cases had been left; firing was prevalent, lines close and deep. We observed several sore backs. In the cavalry barracks at St. Germain, we saw in the infirmary stable a horse fired by deep penetrating points all over the scapular region; the part was covered with flies. The slings used in the infirmary were fixed above to an iron cradle which ran on two parallel bars by means of

wheels; the arrangement appeared to be a very good one for moving the patient without disturbing him. The slings had by them an irrigation apparatus; there was a foot bath in this infirmary for lame cases. The method of frost shoeing adopted by the regiment was rose-headed nails; the store shoes were very indifferent; the forge had a double cylinder blast. In the artillery barracks at Vincennes we saw a case of Nocard's operation for punctured Navicular bursa, also an ingenious and simple contrivance to take the place of cradles, consisting of a bar of iron attached to the head collar by two arms, hollowed to admit the chest and kept in its place by a strap over the neck. There were one or two suspicious cases under observation in the infirmary, and in the next box to them was a mare (healthy) with foal at foot. In the yard was a suspicious case tied up to the wall; no extra precautions appear to be adopted with these cases. The veterinary surgeon thought highly of guinea-pig inoculations in doubtful cases of disease; his method consisted of injecting three or four syringes full of fluid (discharge mixed up with water) under the skin, an operation likely to be attended by fatal results in such a susceptible animal as a guinea-pig. The actual cautery appeared to be abused.

The frost nails used here had large square heads, and are inserted at toe and heels; the farriers carry a shoeing wallet. We were shown a multiple shoeing tool, said to be devised by the veterinary surgeon, contrived to bring as many tools as possible into a single instrument. Machine-made nails are used. The forge waggon was on springs, the blast a double iron cylinder; shoes and nails are carried on the limber; three sets of store shoes are carried, and the nails are inserted in a straw plait or leather roll.

In the German army we saw no veterinary surgeon or sick lines; we were given to understand that the infirmary stables were only used for suspicious cases. We were struck by the absence of firing and other blemishes so conspicuous in the French army.

The Belgians have excellent sick lines, an operating shed containing a trevis and forge being part of the place. We saw the men at work in the forge; they clench up the fore feet in a strange manner, the foot being placed on a block. The pharmacy is well provided.

In Paris we paid a visit to the Alfort Veterinary School. All the cases appeared surgical, and there seemed an unnecessary amount of blood about. In casting horses they use the old-fashioned hobble and a strap to keep the head back. They fire with a fine penetrating point, which they say is superior to line firing, going completely through the skin and taking a long time over it, they pass over the same place a dozen times or so. It is said the slower it is done the better the effect. Another instrument for the same kind of firing is a fine needle made red hot by a heater fixed in the apparatus, and which can be changed at pleasure. In the infirmary was a suspicious case; no special precautions appeared to be adopted to prevent contagion. The infirmary stables were hot, stuffy, all windows closed, and no attempt at ventilation.

The museum is very fine, rich in anatomical and physiological material, poor in pathological, nothing hygienic in the place. A new museum, library, dissecting rooms, and laboratory have just been added to the institution.

We had the pleasure of seeing M. Nocard, who described his operation for punctured Navicular bursa. The sole and frog are drawn, a semicircular piece cut out of the sensitive frog and perforans tendon, and the bone scraped with a sharp spoon. They say the cases recover in three months and are fit to work; it must however be a hind foot. The operation is not universally accepted.

We applied for permission to see the stables of the General Omnibus Company, Paris, and regret to say we were refused.

We paid a visit to Pasteur's laboratory and, through the courtesy of Dr. Roux, saw a large number of patients inoculated, and afterwards had an opportunity of seeing the method of preparing and keeping up the supply of virus.

In Brussels we visited the king's stables, and were shown by M. Hardy, P.V.S., a most interesting case of fracture of both inferior maxilla above the symphysis, just anterior to the molar teeth; the jaw was hanging down. By a very simple contrivance the bones were held in apposition so completely that in the space of a couple of months union had taken place and the horse cured. The remarkable feature in this case was the extreme age of the animal—twenty-eight years.

We also visited the Bruxelles Veterinary School and were shown round the establishment. The museum is very fine, a paucity of pathological, but rich in physiological, zoological, and obstetrical material; there is nothing hygienic. The horse clinic was smaller than at Alford, but the variety of patients much larger—canaries, parrots, dogs, cats, etc. The canine practice was very fine. The infirmary stables were fair, but the accommodation small. We saw firing done with a red-hot needle; it is highly recommended for sprains and chronic enlargement. The method of inoculating guinea-pigs in suspicious cases is very simple; the hair is clipped off, three or four scratches made at the back of the head, into which the nasal discharge is rubbed. They are perfectly satisfied with the reliability of this test, and spoke enthusiastically of it. The period of incubation is five days, when, if the case is Glanders, pus will be found under a thin crust covering the scratches; if no pus exists under the crust the case is not affected. Inoculating horses with the pus will produce Glanders. We saw two inoculated cases, one with Farcy and Orchitis, and the other with pus under the crust at seat of inoculation and also Orchitis. A guinea-pig was inoculated from a suspicious case; on the fifth day the part had completely healed, and the professor was certain that the horse was not affected. We were told that guinea-pigs rarely die from Glanders, excepting the case is very acute.

In the forge of the school we observed that bars of lead are given the students to practise shoe-turning with.

We were shown round the State vaccination establishment which exists in the school; the important work done here is carried on by veterinary surgeons. A translation is attached of the most important points observed in the preparation of the vaccine. We have obtained this information from a pamphlet issued by the authorities. We were impressed with the extreme cleanliness of everything appertaining to the establishment, and the evident care given to the preparation of the vaccine, ensuring absolute purity.

(1) "The vaccine is cultivated from calves of three or four months' old, weighing not less than 220 lbs., each calf being separately and carefully examined."

(2) "Immediately after the crop of vaccine has been taken, the calves are destroyed, and the carcases carefully examined *post-mortem*. If there be any sign of disease in an animal, the vaccine obtained from that source is destroyed."

Full and clear particulars are given in "Notice sur l'Office Vaccinogéne Central de l'Etat Belge, par le Professeur Alphonse Delgive, Directeur de l'Establishment," published by authority. Considering the enormous importance of obtaining absolutely pure vaccine lymph, would it not be a measure of sound economy for the Army Veterinary School to take charge of its production for the whole service, in order that the absolute purity and freedom from disease of each specimen should be guaranteed?

Considering the risks which are at present run, and the naturally popular apprehension which is excited when a lymph source is looked for, it has

occurred to us that the whole of this can be easily overcome at a small outlay by carrying out at the Army Veterinary School the work so successfully prosecuted in Belgium.

Concluding, we desire to call the attention of the profession to the continental system of hot needle firing for sprains and chronic enlargements, and to the guinea-pig inoculation as a test for Glanders and Farcy. On the latter point the Brussels veterinary professors are enthusiastic, and are perfectly satisfied with its certainty.

Aldershot, 30th *Sept.*, 1887.

AN INTERIM REPORT ON INVESTIGATIONS INTO THE NATURE AND PREVENTION OF THE SOUTH AFRICAN HORSE-SICKNESS.

BY J. A. NUNN, F.R.C.V.S., F.R.G.S., ARMY VETERINARY DEPARTMENT, NATAL.

Arrival in Natal.—I arrived in Natal on January 5th, 1887, and established a laboratory in a building hired in Pietermaritzburg for the purpose of my investigations. I am glad to be able to inform you that, with the exception of a few test tubes and one or two glass dishes, all the apparatus I brought out with me from Messrs. Baker and Co., High Holborn, arrived safely.

I brought out 100 agar-agar culture tubes that Dr. Klein and Mr. Lingard kindly had prepared for me in the laboratory of the Brown Institution, Wandsworth-road. These I brought out with me in my own cabin, which was on deck. During a gale in the Bay of Biscay the sea got in and wetted the box, but, notwithstanding, every one of the tubes arrived in good condition.

A few of them were wetted, but the water had only penetrated a very short way into the cotton-wool plug, and the agar-agar inside remained perfectly sound in the whole of them. This perhaps is worthy of notice, as I believe that most of the agar-agar culture tubes that were taken out by Dr. Klein to Calcutta for the Cholera Commission did not stand the voyage, the sterilising apparatus now used not being then invented.

First case of Horse-sickness.—The first case of Horse-sickness, "a sporadic one," occurred in Pietermaritzburg on January 11th, 1887; but as, unfortunately, I had not then got up any of my apparatus from Durban, I was unable to take advantage of it. In conjunction with Messrs. Rowe and Crawford, A.V.D., I made a *post-mortem* examination with such means as were at our disposal, and, from some of the *post-mortem* appearances, I was much inclined to think the case was one of Anthrax. This opinion for reasons that will be seen further on, I would beg particularly to draw your attention to.

Forms and Symptoms of Horse-sickness.—The symptoms of the four forms of South African Horse-sickness, viz., "Blue Tongue," "Dik Kop," "Bilious," and "Pulmonary," have been so well described by Inspecting Veterinary Surgeon J. Lambert and Veterinary Surgeon Rutherford, A.V.D., in their pamphlets on the subject, and are so well known, that it would be recapitulation for me to enter into them; suffice it for me to say that I quite concur with those gentlemen in their description of the symptoms, that I consider these only different phases of the one and the same disease, and that I have seen one form run into the other, and *vice versâ*.

South African Horse-sickness has generally been considered to be Anthrax, which no doubt in many respects it greatly resembles. That this diagnosis was made I can readily understand, as without a very careful series of experiments it would not be easy to determine that it was not so. In fact,

as I have before stated, in the first *post-mortem* examination, when I had not a microscope, I fell into the error myself.

Outbreak of Horse-sickness in 1887.—The epizooty of Horse-sickness commenced in Pietermaritzburg on the 8th March and ended on 20th May, 1887. I give a detailed statement and an extract of the number of casualties in the various mounted corps in Natal in a separate table, marked "Appendix A."

Preparations of Materials for Investigation.—The liquid cultivating medium, *i.e.*, beef-peptone broth, I made in the Colony, as it was impossible to carry it out from England. The hot-air chamber and steam steriliser, necessary to prepare this with, I had made by an ironmonger in Pietermaritzburg, from drawings I gave him, and they worked satisfactorily.

I had at first considerable difficulty in sterilising cotton wool for plugs of culture tubes. As there is no gas in the Colony, I tried to do this over the fire of a field forge, in a closed oven with a double lining; but to get the necessary heat (150° Centigrade, 302° Fahr.) the fire had to be blown up so fiercely that the bottom burned out of the apparatus and the wool inside caught fire. Furthermore, it was impossible to keep the smoke out, and the wool was completely spoiled by particles of carbon. I then tried using a paraffin stove that I had for the incubator; but, being only a single wick one, it would not give sufficient heat unless it was turned up very high with a great flame, which made the oil in the reservoir hot. This caused a dangerous explosion, which nearly set the whole laboratory on fire. I then obtained a double wick lamp, which easily gave the required heat, viz., 150° Centigrade, and which I found could be left to burn for hours together without the slightest danger; with it I was able to sterilise cotton wool, flasks, tubes, etc., perfectly. The disadvantage of not having a good supply of gas was a dreadful drawback to my investigation; in fact, in bacteriological research, where not only apparent but absolute cleanliness is essential, and where the purification of instruments and vessels has to be carried out by heat, a good gas supply is a necessity; for no matter how carefully oil or other lamps are worked, there is always a certain amount of smoke and dirt, and this, try as I might, I found impossible to avoid.

Where a certain temperature was required to be kept up for any length of time, I could not do it with any regularity with an oil lamp, as not only the variations of day and night, but the opening and shutting of doors and windows, and even the passage of clouds across the sun, caused the temperature of the incubator to vary 3° or 4° F. The only way by which a constant temperature can be kept up for a considerable time (*i.e.*, three or four days together) is by heating the incubator by a gas lamp supplied through the medium of a Page's regulator. I dwell at some length on this point, as you will recollect that I told you before I left England that I anticipated great difficulty from the want of gas, and I find that I have not been mistaken; also, that my experiences may be of use in preventing like mishaps taking place in the event of any further investigations of a like nature being undertaken in remote countries like Natal, where only makeshifts can be obtained.

Proving the Nature of Horse-sickness.—Working on the supposition that the disease I had to deal with was what it has always been described, viz., Anthrax, the first step was to prove it beyond doubt, by finding the characteristic Anthrax bacillus in the blood and tissues of those dead of Horse-sickness, and then reproducing the disease by experimental inoculation.

Discovery of a Microscopic Organism.—In cover-glass preparations of a film of blood taken from the heart with the usual precautions, and prepared in the usual way, I found a microscopic organism (bacillus) that easily stained with Spiller's blue, Methyle blue, gentian violet, or any of the dyes commonly used to render bateria visible. During life I could not find this bacillus in the

blood. In a number of cases I examined the blood taken from the facial or temporal vein at intervals from the beginning of the attack, and in no instance was I able to discover any until some little time after death, "about two hours," when there were numbers present. In the froth that, as you are aware, exudes from the nostrils after death in a white mass like cotton wool, in some instances—but not invariably—the bacillus was present.

Character of the Organisms.—The bacilli in the blood can be seen, in many specimens, joined together in long filaments, with joints in them at irregular intervals. The exact size of these bacilli I am unable to give, as I have not got a micrometer with me, but on my return to England I will have them measured. In the froth I could not find these filaments, only the segments. In sections of the lungs and liver, I found bacilli when stained by Gram's method, but not invariably so; this may be due to want of skill on my part, and perhaps some future observer may be more successful.

Attempts at Cultivation of the Organisms.—I was utterly unable to isolate this bacillus, although I made numerous cultivations, both in beef-peptone broth and solid medium, viz., agar-agar. A growth readily appeared on this latter in the incubator at 42°C. in from 48 to 96 hours; but as the heat was obtained from an oil flame, a constant temperature could not be maintained within 5°C. The growth spreads only on the surface of the agar-agar, not into its substance, and after being kept for about a week at the temperature of the room it assumes a curious pink or salmon colour, which spreads over the original growth, which at first is a straw colour, turning after about ten days into a light orange. This growth is shown in the water-colour drawing. The growth spread rapidly the first three or four days, and then stopped, the pink growth forming and spreading over the original one. The agar-agar was at first very slightly softened. Cover-glass specimens stained with Spiller's purple, methyle blue, gentian violet, or any of the dyes used to render micro-organisms visible, showed it to be composed of very minute micrococci, very much smaller than a red-blood corpuscle, the same result appearing through several generations. The liquid medium—beef peptone broth—became turbid in the incubator at 42°C. in about twenty-four hours, and in from thirty-six to forty-eight showed a well-defined cloudy growth. Cover-glass specimens differed from those obtained from the agar-agar, showing a small bacillus. Sections of the lung stained with Rauvier's Piero carmine, showed that there was acute Pneumonia, with consolidation of the pulmonary tissue.

Inoculations with the Organisms.—Still working on the supposition that I was dealing with Anthrax, I made a series of inoculations on rabbits and guinea-pigs, which, as you are aware, are extremely susceptible to that disease, and are the animals generally used for experimental purposes by workers in bacteriology. These inoculations I made in the usual manner with freshly drawn-out glass pipettes, and in all of them I first verified the disease by making glass-cover preparations of the blood of the horse or mule dead thereof and finding the organism; then, having made certain, inoculating a rabbit or guinea-pig. To avoid any chance of contamination by carrying the blood about, I had the animal to be experimented upon conveyed to the field or other place where the *post-mortem* examination was made, and performed the inoculation at once.

Negative Results of Inoculation.—With the exception of the mule, No. 2721, inoculated on March 25th, and the sheep on the 4th April, there was no result at all, none of the animals appearing a bit the worse. The mule and the sheep in which results were seen, I will particularly mention further on. A Table showing the animals experimented upon, with the results obtained, is shown in "Appendix B."

Some of the animals, as will be seen, were inoculated with the beef broth in

which I had endeavoured to grow the bacillus, and in which, as I have before remarked, very small bacilli were present; but as there was no result it was impossible to say if this was the bacillus present in the blood that had undergone metamorphosis by artificial cultivation, or if it was merely an extraneous organism that had obtained entrance to the culture medium, as in order to determine if an organism is pathogenic or not, according to the axiom of Koch, it is necessary to discover the organism in the body of a diseased subject, isolate it by cultivating it in an artificial culture medium for several generations, then introduce it into the healthy body of a like creature, reproduce the disease, and rediscover the organism. But this I altogether failed to do in a single case.

Experiments have been mentioned in the pamphlets of Messrs. Lambert and Rutherford, that were made on goats which were inoculated with horse-sickness blood. These I repeated on sheep, but failed to get any result. One of the experiments quoted I found had been performed on a goat at some little distance from where the *post-mortem* examination on the horse had been made. The blood was removed in an ordinary subcutaneous syringe, which had been used before, and which no special precautions had been taken to sterilize, and in it carried to the subject to be operated upon. Is it not possible that the result obtained was some form of blood-poisoning or septicæmia from contamination of the fluid injected either by the syringe or by exposure to the atmosphere in transit? An experiment is also quoted as performed by D. Hutcheon, Esq., Colonial Veterinary Surgeon of the Cape Colony. That gentleman informs me that he fell into an error, confounding "Anthrax" with Horse Sickness. The cases he saw were when he first arrived in the colony, and being informed by old experienced colonists that they were Horse-sickness, and finding that it was communicable, he naturally concluded that Horse-sickness and Anthrax were the one and same disease. Subsequent experiments and experience, he informs me, showed him the mistake he made, and in his opinion the two diseases are different. It has also been stated that Horse-sickness can be reproduced by inoculation with the fluid from the lungs of a horse which has been dead twenty-four hours. This experiment I tried, but without any result; and, indeed, if there had been it would have been valueless, as septic or putrefactive germs would undoubtedly have developed in a climate like this in an animal dead for twenty-four hours. I inoculated three mules of the Transport Department, Nos. 2655, 2188, and 2721, on the 23rd, 24th, and 25th of March, from cases of Horse-sickness, in which I had found the bacillus in the blood.

These inoculations were made with new Pravaz syringes previously sterilised. The mule, 2721, operated on on March 25th, died on April 4th at 5.30 p.m., after five and a half hours' illness from Horse-sickness. From this mule I inoculated two sheep and two rabbits. One sheep died about forty-eight hours afterwards from inflammation of the intestines, together with, I think, the results of confinement, as both these sheep were animals caught from the Veldt, and had never before been handled. The other sheep and the two rabbits showed no result, and are alive now. From the sheep that died on April 6th, I inoculated a rabbit and a guinea-pig; these showed no result. Now, allowing that the period of incubation of Anthrax (which is generally forty-eight hours: "Klein's Micro-organisms in Disease," page 147, and "Vaccination Charbonneux," by Chs. Cumberland, page 211), is, in South Africa, from climatic or other causes, ten days, then the mules, Nos. 2655 and 2188, inoculated on the 23rd and 24th of March, should have died on the 2nd and 3rd of April; whereas they never showed the slightest results, and are alive now.

Again, allowing that the inoculations had taken effect (which, if Anthrax,

they undoubtedly would have), but in such an obscure manner as to have escaped my notice, then this mule, No. 2721, should have been protectively inoculated, and should not have contracted the disease naturally. From this experiment I argue that the mule, No. 2721, that died, contracted Horse-sickness naturally, and that no contagium existed in the inoculations I made.

Non-contagiousness of Horse-sickness.—Numerous instances have come under my notice of animals being in contact with diseased ones, without any ill results. A gentleman in the Mooi River district, where Horse-sickness was very prevalent in 1866, had a mare with a young foal at foot; the mare died on the Veldt, and was not discovered for about thirty-six hours, when the foal was seen endeavouring to suck her, and had presumably been doing so for some time. Another gentleman told me that up at the gold-fields at Barberton, he was driving a pair of horses in a Cape cart, when one of them suddenly became ill and died in a short time. He sent back his Kaffir boy to get another horse, and as he was a long way from home, he took the other horse out of harness and knee-haltered him, turning him out; and then himself lay down under the shade of the cart, where he fell asleep. He woke up in the course of an hour or two, when he found that the live horse had been most of the time standing over his dead companion, smelling at him, and that some of the froth from the dead one's nostrils had adhered to those of the living one. Mr. Wiltshire, Colonial veterinary surgeon, Natal, had a horse in his stable which died during the night, and was not discovered till the following morning. During the whole of this period, the one next him had been in close proximity to the body. A contractor in Durban informed me that, some years ago, one of his horses was found to be very ill from the pulmonary form of Horse-sickness, and had blown a quantity of froth from his nostrils over the food in the manger. The animal was removed and died. He gave directions to one of his Kaffir boys to remove the food, sweep out the stall, and not put any other horse into it, but he found his orders were not obeyed; a horse was put into the stall, and ate the whole of the dead one's rations, over which the froth had been blown, yet he never suffered in the least, and is alive and well now.

During the epizoöty, a number of carcases of horses dying at Fort Napier were taken by a contractor who lived at the lower end of the town of Pietermaritzburg, to be boiled down, but the passage of them through the town did not make any difference in the cases amongst the civil population, which, I may remark, were comparatively few. The conclusions I draw at present from the above facts and experiments are that Horse-sickness is not contagious; which, from the results of experience, is the universal opinion of the Boers and farmers of South Africa, and cannot be reproduced by direct inoculation of the blood from a diseased to a healthy subject; neither is it infectious.

The Disease is not Anthrax.—This being so, it cannot be Anthrax, which was reproduced from the one-thousandth part of a drop of blood by Davaine, and which is well known to be a most virulently contagious disease.

The following facts in addition, go to point out that Horse-sickness and Anthrax are different diseases. In none of the *post-mortem* examinations I have made have I found the characteristic anthrax spleen, which is soft and broken down, resembling a bag full of fluid blood; it has always been of a normal consistency. In some cases it was somewhat enlarged, but to no great extent, and the edges of it rounded: but it was so little softened that I was easily able to preserve and harden it in spirit, which with an anthrax spleen I certainly could not have done.

Decomposition sets in rapidly in Anthrax. "Le cadavre ex décompose rapidement, du sang s'ecoule par les cavités nasales et le ventre est balloune

considérablement (*Vaccination Charbonneux de Pasteur*, page 13)." This was not my experience with Horse-sickness.

Non-transmissibility of Horse-sickness to Ruminants.—It is a well-known fact that ruminants are much more susceptible to Anthrax than solipeds. During the Horse-sickness season, on certain low-lying lands or Vlies round Pietermaritzburg, especially on the town lands and Zwaartkop Valley, no man would turn out a horse or mule at night and expect to find him alive in the morning. Yet at this time I have seen herds of hundreds of cattle grazing there day and night. In one spot just outside the town is a regular encamping ground, on which waggoners encamp for the night, turning their oxen out to graze. I made particular inquiries if there was any disease amongst these animals, and could hear of none; in fact, some of the owners seemed rather surprised at my suspecting such a thing, and said that for years past this encamping ground had been used, and that during the sickly season they had avoided bringing mules and horses from the high country into Pietermaritzburg, but had no hesitation about oxen. On part of the road to the Barberton Gold Fields Horse-sickness was so bad that, for several stages, the mail-coach was drawn by oxen, which lived and did well.

Non-transmissibility of Horse-sickness to Mankind.—During the time troops have been in Natal, some hundreds of *post-mortem* examinations must have been made on horses that have died from Horse-sickness, by farriers and shoeing-smiths. These men, from the very nature of their work, must have had scratches and cuts on their arms and hands, yet in both the civil and military hospitals there is no record of any ill results to a human being from making such an examination in a case of Horse-sickness. This information has kindly been given me by Surgeon-Major Coates, A.M.S., who has seen much service in South Africa, and Dr. J. Allen, who has been many years in practice in Pietermaritzburg. On two different occasions I myself saw farriers who, in making *post-mortem* examinations, cut their hands. One man had done so before I saw him, and when he came under my notice he must have been at least ten minutes cutting up the carcase, with a deep open cut on one of his fingers, and his arms covered with blood from the dead horse. Another instance came under my notice of a wound having been inflicted by the broken end of a rib; but in none of these was there any ill result. While working in my laboratory, I inoculated myself accidentally in the hand with a glass pipette containing blood from a case of Horse-sickness. I did not notice the broken piece of glass for some little time perhaps a minute. I cauterized the wound, but there was ample time for the blood to be absorbed, and if it had been Anthrax, I probably should not have been alive to write this report.

Differences between Horse-sickness and Anthrax.—Anthrax usually occurs in extremely hot weather, and rapidly runs through a flock or herd of animals, large numbers dying in the course of a few hours; whereas in the late epizoöty at Fort Napier, the greatest number of deaths in one day was nine. *Vide* "Appendix C."

One attack of Anthrax generally gives immunity from a second, and on this fact the theory of protective inoculation is based. Animals that had recovered from an attack of Horse-sickness (salted, as they were termed), were looked upon as enjoying immunity, and commanded a better price in the market. Of late years this has been open to doubt; but it was difficult to prove, from the fact that horses were often represented as being "salted" when they were not so.

Liability to Several Attacks of Horse-sickness.—During the late epizooty, several cases came under my notice of animals that had recovered from Horse-sickness in former years, but which died this year. One of these had been in the owner's possession for ten years, and had recovered from two

attacks. There was a remarkable case of a horse which was attacked at the commencement of the sickly season and recovered, but died of a second attack later on.

Outbreak of Anthrax in Sheep.—An outbreak of disease took place in a flock of sheep belonging to a Mr. Boothes, near Grey Town, Umvoti County, Natal, in April, 1887. As a large number had died, and continued doing so in spite of the precautionary measures and treatment adopted by the owner, he consulted some of his neighbours, many of whom had been farming in the Colony all their lives, and these gentlemen agreeing that they had never seen anything like it before, Mr. Wiltshire, Colonial Veterinary Surgeon, was called in. By the kindness of this gentleman, I obtained some of the blood from these sheep, sealed up in vaccine tubes, and dried on cover-glass; as well as some of the organs, liver, etc. In the cover-glass preparations, I discovered the Anthrax bacillus. With the blood of the sheep I inoculated several rabbits and guinea-pigs which died in from thirty to sixty hours, and in their blood I found Anthrax bacilli. Mr. Wiltshire inoculated a rabbit at Grey Town with the blood of a sheep; this animal died. Mr. Boothes inoculated a rabbit at his farm with the blood of a sheep, and sent it to me at once alive to Pietermaritzburg. It died in forty-eight hours after inoculation, and in its blood I found the Anthrax bacillus. From this animal I inoculated several other rabbits and guinea-pigs, all of which showed typical Anthrax. I also found the Anthrax bacillus in the livers of the sheep. Under the microscope the two organisms appear different; that of Horse-sickness being larger and broader, the joints longer, and more irregular, and the ends rounder than those of Anthrax, the joints of which appear to be cut across in a straight line, forming a right angle to the sides; several Kaffirs—forty or fifty—on Mr. Boothes' farm became very ill, and six of them died. The men had been eating the diseased meat and handling the dead sheep. M. Pasteur made the experiment of feeding a number of sheep on soft food that had been watered with the bacillus and spores of Anthrax, but with little result. The same sheep, when fed on the same food watered with the bacillus and spores of Anthrax, but in which thorns and thistles were placed, and the membrane of the mouth lacerated thereby, died of Anthrax in considerable numbers; thus proving that, as long as the membrane of the alimentary canal is intact, Anthrax is difficult to produce, or, in other words, results are not obtained unless the organism gains direct access to the blood. I have seen the same results follow in mice kept in a cage, and which have eaten their companions that died from artificially-produced Anthrax. In a case in Essex (VETERINARY JOURNAL, 1887), a veterinary surgeon either died or became dangerously ill from Anthrax, having contracted it while making a *post-mortem* examination, by a drop of blood falling on a small abrasion of his arm made by his shirt. In both these instances—viz., at Grey Town, in Natal, and in Essex—persons contracted the disease either from the most trivial wounds, or else, in the case of the Kaffirs at Grey Town, by the most difficult manner in which Anthrax can be reproduced, which difficulty would be increased by the fact that the meat was to a certain extent exposed to heat; for, although not very particular as to their cooking, Kaffirs do not actually eat their meat raw.

Deductions from Facts and Experiments.—The deductions from the above facts and experiments are:—

1. That Horse-sickness cannot be reproduced by direct inoculation in rabbits, guinea-pigs, mules, or sheep. That the disease in the Grey Town sheep can be reproduced in rabbits and guinea-pigs.

2. That human beings do not suffer any ill results from handling carcases of horses dead from Horse-sickness, though they may have cuts and wounds

on their hands; but those who were about the sheep at Grey Town did, they either dying or becoming dangerously ill.

3. That experienced farmers who had been all their lives in the Colony—men of good powers of observation, had never seen or heard of any disease like that amongst the Grey Town sheep; whereas they were well acquainted with Horse-sickness, and they all specially noticed the condition of the spleen, which in the sheep they said "the milt looked like a bladder full of blood, and the carcase soon became rotten."

4. That there is a considerable difference in the appearance, under the microscope of the micro-organisms obtained from cases of Horse-sickness and from the Grey Town sheep—so much so, that it was noticed by unskilled persons, officers and others.

5. That the disease in the Grey Town sheep was Anthrax, and that Horse-sickness is not, and that Anthrax is, very rare in the Colony.

Horse-sickness a Malarial.—I am much inclined to the opinion, from the result of the experiments made this sickly season, that Horse-sickness is of malarial nature. It is an admitted fact that, as a rule, it is not so prevalent on high as on low ground. I say as a rule, because, although on the Highlands of South Africa the disease is most uncommon, last year—1886—it was very severe in the upper parts of Natal, viz., the Mooi River, and on the Drakensburg and Biggersburg Mountains, the former of which are some 8,000 feet high. At first sight, this may seem to at once veto the malarial theory, but it must be borne in mind that Yellow Fever has been very severe in the Blue Mountains of Jamaica, and Cholera is not unknown at considerable altitudes in the Himalayas. It is also an admitted fact that horses in stables are not so prone to the disease as those in the open, and racehorses are asserted never to get it, the fact of their being in hard condition being usually said to be the reason. I think this can be accounted for, from the fact that if a man has a racehorse he keeps him in a stable worthy of the name, and, furthermore, he does not take him out after sundown. This, I think, is a most important point to be observed; for I have noticed that nearly all the cases are attacked either shortly after sundown or in the very early morning—few or any in the daytime. The owner of a racehorse will be careful about closing the doors and windows, not exposing the animal to a draught: as a rule, too much care is taken by the ordinary groom on this point. It is, however, common to hear of horses dying in stables; but if one comes to look at the generality of the stables in Natal, they are not worthy of the name, being only sheds of corrugated iron that keep the rain off. The season of the year—end of the summer and autumn—and atmospheric conditions, furnish another strong argument in my mind in favour of malaria being the cause of Horse-sickness. That period of the year in Natal is the rainy season, all the low-lying lands being swamps. It is also the time of year when there are greater atmospheric changes than at any other—*i.e.*, thunderstorms, rain-showers, etc., with a great range of both barometer and thermometer. The town of Pietermaritzburg is situated in lat. 29.3 S. and in long. 30.2 E., in a basin about 1,500 feet above the sea, entirely surrounded by high hills, with the river Umsindusi running through it. Fort Napier is on a low ridge, or spur, about 2,220 feet above the sea level, in the middle of this valley, and is surrounded on three sides by low swampy ground, known in South Africa as Vlies. These are shown in the plan. The artillery and part of the cavalry lines were on the south-west side of the ridge overlooking the town valley, the mounted infantry and remainder of the cavalry on the north-east side looking over the Zwaartkop Valley, and lower down in the valley itself is the Transport Yard shown in the plan. The mounted infantry and artillery mules (the battery being a screw-gun mountain one) were picketed out in the open, the cavalry in iron sheds

(I cannot call them stables) open on one side; the transport animals also in sheds open on one side, made out of some old buildings. I noticed that when a mist rose from these valleys, those were the days most animals were attacked. When the wind blew across the Zwaartkop Valley from the north, the transport and mounted infantry suffered; when from the east, the cavalry and artillery. This, be it understood, was not the prevailing wind, but rather eddies caused by the surrounding hills. Apparently the ridge of the hill on which Fort Napier is situated broke the force of the wind, deflecting it upwards, and presumably the miasma with it. I also noticed that the sides of the hill towards which the wind was blowing were covered with mist at night, which rose up the side from the valley beneath; whereas the lee side was quite clear; furthermore, on calm nights, when the mist was at the bottom of the valleys, and was not blown up the sides of the hills, cases were not so frequent; but a fall of rain or thunderstorm in the day, followed by a hot sun and a wind in the evening, was a certain forerunner of it. Another fact to take into account, is that the autumn, when horses are changing their coats, is the time of year when they are more susceptible to miasmatic influences than any other.

Coincidence of outbreak of Horse-sickness and Fever in Mankind.—During the time that the epizoöty of Horse-sickness was at its height, and the weather as I have described, a number of persons suffered from fever. I myself had several relapses of Peshawur fever contracted in India. This appears to point out that there is some deleterious climatic influence at work at this season of the year.

Physiography of Natal in Relation to Horse-sickness.—A glance at the map (Appendix D), will show how Natal is situated. The whole country is more or less of a basin open to the sea, sloping down from the Drakensburg Mountains on the west to the Indian Ocean on the east. It will also be seen that the whole of the watershed of South Africa is to the east, the high ground being to the south and west. Starting from the coast and following a certain parallel of latitude, the further west one proceeds, Horse-sickness diminishes; and following a meridian of longitude, it decreases to the south, where it is cold; whereas, to the north, about Barberton and the De Koop Valley, it is very severe; and on the coast in the same latitude, about Delagoa Bay, at a lower level, it is almost impossible to keep a horse alive, while a most severe and fatal form of Malarial Fever attacks human beings, one night spent on shore during the rainy season being enough to bring it on. The deduction from this is that the further west to high altitudes, and the further south to colder regions one goes, malaria in man and animals diminishes; but that, in the north, towards the equator, and east, to the low country on the sea, it increases, until it reaches its climax in the notoriously unhealthy regions about the Mozambique and Zanzibar; and tha Natal, from its latitude and peculiar watershed off the surrounding highlands, is on the border-line of these malarial districts. I furthermore noticed that northerly and easterly winds prevailed during the epizoöty. The great Antarctic drift current, which is shown coloured blue in the map D, coming up from the southern polar peak, strikes the Cape of Good Hope, which divides it like a wedge, deflecting the greater portion of it up the west coast, where it circulates round in the South Atlantic to the coast of South America, forming the southern Sargossa Sea. A small portion does run up the east coast, which fact is well known to the steamer captains, who, on the voyage from Cape Town to the east coast ports, stand in close to the shore to take advantage of it. Another current shown red in the map, coming from the Bay of Bengal and the Straits of Malacca, runs down in a southerly direction, through the Mozambique Channel. The north-east wind, which, as I have said before, is the prevailing one at this season of the year,

coming as it does from about the hottest part of the world, is hot and dry, and ready to absorb moisture. This it is not able to do to its full capabilities, from the ocean being kept heated by the influence of the warm current, but on coming under the influence of the cold in-shore current, it does so to a certain extent. I say to a certain extent, as its velocity carries it to the land, and most of the moisture is absorbed from the brackish river-mouths, which are lying stagnant under an almost tropical sun. An experience gathered on the west coast of Africa, and the tropical parts of South and Central America, goes to show that stagnant brackish water is a fruitful source of malaria. If this theory be correct, it would account for Horse-sickness being more prevalent on the low-lying lands than in the mountains, and diminishing in the southern and colder regions of the Cape Colony.

Form of Horse-sickness in 1887.—The general form this disease took this year was that described by Messrs. Lambert, Rutherford, and Wiltshire, as "Dik Kop" and "Blue Tongue," although there were a number of cases of the pneumonic form. In the majority of cases, animals were first noticed to be ill in the evening, the first symptom being that they did not eat their evening feed with their usual zest, although they had been perfectly well and working all day. In the great majority of cases, I noticed that the pneumonic form was much more fatal and rapid than the others, and also much more intractable to treatment.

Mules less Susceptible to the Disease than Horses.—I noticed that mules appeared to resist the disease better than horses, whether from any modification of the miasma, or from the well-known hardier constitution of the mule, I cannot say.

Supposed Exemption of Donkeys from the Disease.—I could not hear of donkeys dying in Pietermaritzburg, but then there are not many of them used here, though up at De Kopp and Barberton Gold Fields they died in large numbers. Donkeys were supposed to be proof against Horse-sickness, and were largely imported to these regions; but now bullocks are employed, and although the mortality amongst solipeds was great, ruminants were exempted and did well.

The Lung form of Horse-sickness.—Some solipeds were at once attacked with the pneumonic form of the disease, but not many. This usually supervened on the Blue Tongue or Dik Kop. An animal would be admitted to the sick lines in the evening, reported not to have eaten his evening feed well. On examination, the conjunctiva and Schneiderian membranes would be found to be somewhat congested, but not to any very great extent. The pulse would be about fifty beats per minute, a little full and hard in character, and the respiration normal. The tongue and mouth would be a little dry and hot, with considerable thirst and loss of appetite; the bowels invariably costive, the fæces being passed in small, hard, dry pellets. In the urine nothing could be observed, neither could I at any time detect any bacilli present in the blood. The temperature taken *per rectum* was usually about 102° F. to 104° F., but in the course of a few hours it would run up to 105, 106, or even 107° F., these last ones always indicating a fatal termination. After a period varying from two or three to twenty-four or forty-eight hours, a thick viscid discharge, more or less tinged with yellow, came from the nostrils; this was speedily followed by the well-known difficulty in breathing, the respiratory movement being painful, and laboured in a varying degree. By treatment, these symptoms would sometimes subside (particularly with mules), and the nasal discharge with it, the animal relapsing into its former condition, but very prostrate. These pneumonic attacks came on at intervals of six to twelve hours, increasing in violence each attack, and weakening the animal more and more, till at last, after the third or fourth, he died. The temperature

rose and feel about one degree F. morning and evening, but I did not notice that the pulmonary paroxysm when it came on, made any alteration. This rise and fall took place with great regularity till an hour or two before death, when it fell several degrees below normal to 98° F. and 97° F. The cases in which pulmonary symptoms manifested themselves from the commencement, comported themselves as described by Messrs. Lambert and Rutherford.

Complication of the Disease.—Several cases were much complicated. In two mules, on the second day after the commencement of the attack, the disease degenerated into a low typhoid condition, with crimson mucous membranes, exudation of blood from the skin, particularly in the bends of the hocks and knees, somewhat resembling the usual symptoms of Purpura Hæmorrhagica. With both these animals there was a peculiar fœtid smell, and both cases terminated fatally. Great œdema, especially of the hind limbs, was another complication, with indolent sloughing, which discharged a thin ichorous pus. In several instances, cerebral disturbance took place. One very remarkable one occurred in the 6th Dragoons. The animal had been suffering from "Dik Kop" in the usual manner, when he was found to be blind. On examination I found him to be completely amaurotic, both pupils being widely dilated and insensible to light, with paralysis of the lower lip and muscles on both sides of the face supplied by the superior maxillary branch of the fifth nerve. There was a well-marked venous pulse in the jugular vein, and the second sound of the heart was almost lost. I think the origin of these symptoms was due to a clot formed in the heart from absorption of morbid material, with a secondary clot at the base of the brain interfering with the functions of the optic and fifth nerves, possibly caused by an embolus. As I was at Grey Town inquiring about the outbreak of Anthrax amongst Mr. Boothes' sheep, I was unable to be present at the *post-mortem* inquiry.

Period of Latency of Horse-sickness.—The question as to the period of incubation, I am unable to determine with any certainty, nor in my experiments have I been able to reproduce the disease; but there is a general opinion entertained in the colony that it is ten days. This opinion is founded on practical experience, although there is no positive or experimental proof that such is the case. At Etchowe, in Zululand, which, although north of Pietermaritzburg, lat. 28.54 S., long. 31.30 E. and near the coast, is of considerable elevation (2375 feet) above the sea level, Horse-sickness is most uncommon, and Veterinary Surgeon Finlayson, A.V.D., the officer in charge, informs me that all the cases that have come under his observation there have been animals that have been in the low-lying country, surrounding it within ten days' journey, which fact gives some colour to the prevailing theory on the matter.

Non-Success of Medical Treatment of Horse-sickness.—I regret to say that, in addition to the exhaustive experiments of Mr. Rutherford, I have tried almost every drug I could think of, and with but little success. Large subcutaneous injections of quinine undoubtedly had the effect of lowering the temperature, and some few cases did well with it. Carbolic acid, also, I had a few good results from, combined with salines, especially sulphate of magnesia and chlorate of potash, with large quantities of stimulants. In the pneumonic form I found that both fomentations and packing had the most injurious results; the first few cases I tried with it becoming rapidly worse in the most astounding manner. Antifebrine and antipyrine have both been highly spoken of lately in the human subject, and I intend to give both these drugs a trial the first opportunity.

Anthrax in a Mule.—Since commencing this report I had the chance of seeing an animal (a mule) that died of Anthrax on the 20th July. The *post-mortem* appearances (for I did not see it during life) were the classical ones

of Anthrax, particularly the absence of any froth from the nostrils, and the softened condition of the spleen. From the blood of this animal taken in the usual manner, I inoculated a full-grown guinea-pig that I before had inoculated three times with the blood of Horse-sickness. This animal died in about twelve hours, with all the appearances of Anthrax. The typical bacillus I found in its blood and tissues.

Facts and Observations in this Interim Report to be Re-considered next Horse-sickness Season.—In conclusion, I would beg to be allowed to remark, that in submitting this report, the statements and conclusions I have arrived at are entirely drawn from the experiments I have made and the facts I have observed during my stay in the colony. It is quite possible that I have made mistakes, but during the next sickly season I propose to again commence another series of experiments, and perhaps some new light may be thrown on the matter thereby. If so, and Horse-sickness proves to be communicable, then I must ask you to allow me the right to alter or withdraw any of the views or theories I have expressed, if they are untenable.

SOME OF THE RELATIONS OF VETERINARY TO SANITARY SCIENCE.

BY ARCHIBALD ROBINSON, F.R.C.V.S., GREENOCK.

(*Continued from p.* 324, *vol.* XXV.)

Respecting the temperature in cooking which the virus will resist, there exists, contrary to what might be expected from the remark of Dr. de Lamalleree, some information.

M. Toussaint, to whom the credit belongs of having first cultivated the microbe of Tuberculosis, instituted in 1881 a series of experiments, from which he learnt that a temperature of 52° C. (125·3° F.) was not sufficient to destroy the virus, this temperature being in excess of that at which steak is often cooked. Continuing these experiments, he discovered that even after being submitted to a temperature of 71° C. (159·4° F.) the virus could still be successfully inoculated.

In view of the prevalence of Tuberculosis in our animals, these experiments point to the necessity of a much more thorough control of our meat and also of our milk supply. The majority of observers seem to consider that the milk of tuberculous animals is only dangerous when the mammary gland is affected, but Dr. Bang, of the Veterinary School of Copenhagen, as well as some others who have also made experiments in this direction, conclude that in some cases (though not in all) of general Tuberculosis, the disease can be communicated by means of the milk while the mammæ still appear to be healthy. Dr. Bang also quotes a case where a child brought up on a cow's milk whose mammary gland was the seat of tubercular alterations, died, at six months old, of Consumption.

Notwithstanding the fact that recent scientific research has made the duty of prohibiting the use of the flesh of tuberculous animals incumbent on us, we are still more lax in the matter than they appear to have been in certain parts of the Continent in the fourteenth, fifteenth, sixteenth, seventeenth, and eighteenth centuries. For, according to an article in last month's *Recueil de Médecine Vétérinaire*, by M. Ch. Morot, a number of the cities of France prohibited the use of the flesh of animals suffering from this disease.

For very many years it has been looked upon by some in this country with more than suspicion, and from 1865 up till 1874 my father was in the habit of condemning all cases of general Tuberculosis, and in cases where the

disease seemed to be localised, of condemning the viscera. Having myself been privileged to follow a series of experiments on its transmission from bovines to porcines, both by inoculation and ingestion, by M. St. Cyr, at the Lyons Veterinary School, in 1873, my recommendation in Greenock to our local authority to destroy all carcases, no matter how slightly affected, has been adopted since 1874.

More than this, however, is needed, gentlemen, for it appears to me that veterinary inspectors to local authorities ought to be incorporated in the Public Health Department, and that our dairy animals should be regularly visited and examined. The discovery of the bacillus Tuberculosis by Koch, which, although it only occurred in 1882, is so well known and made use of that few of our physicians neglect the clinical examination of the expectorations and other discharges in suspected cases. It will have been noticed that reference was made to a series of experiments by M. Toussaint in 1881. This may appear to contradict the statement that M. Koch discovered the bacillus, but such, however, is not precisely the case. In 1881 the process of staining, by which means Koch recognised the bacillus, was not known, and as Toussaint's examinations (microscopically) appear to have referred to his cultivated organisms, there seems little reason to doubt that what he described at that time as micrococci were the spores of the bacillus.

It ought to be one of the duties of veterinary inspectors to microscopically examine the milk from suspicious udders, as in some cases what appears to be only slight induration of portion of a mammary gland is the indication of tubercular infection which microscopical examination alone can verify, and for a considerable time the cow may continue to milk well and give no indications of ill health.

In the event of the State giving no compensation in cases of Tuberculosis, as at present, the sale of a cow's milk in which the bacillus is found should be prohibited, and if the proprietor insist on using it himself, he should, if possible, be prevailed on to subject it to a temperature of 212° F.

A very popular idea exists that when a child is brought up on the bottle, it should only have one cow's milk. There seems to me in this the grave objection that unless the cow is subjected to a very careful examination, the milk of one cow, if affected with Tuberculosis, may contain a far larger quantity of tubercle bacilli than if the milk were taken from the total yield of a dairy in which the majority of the animals would probably be healthy.

Gentlemen, so much of your valuable time has already been taken up, that it would be presumptive to encroach on it by discussing the numerous other diseases which are communicable from animals to man. Many more than are at present known will, in all probability, be shortly added to the already long list, by means of the improved methods of pathological research. Recently, as you are all probably aware, Drs. Power and Klein pretend to have traced an outbreak of Scarlet Fever to a disease of the cow. This, however, like Professor Verneuil's idea that Tetanus is of equine origin, requires further investigation. Of the identity of the diseases Anthrax, Glanders, Foot-and-mouth Disease, Rabies, Diphtheria, Tuberculosis, and of their intercommunicability in various animals, man included, there can be no doubt. Of the similarity of the organism in Actinomycosis in man and animals, and of the injurious effects of the flesh of animals that have died of septic affections, such as Puerperal Fever, there is abundant evidence, and the presence of parasites, the more common of which in this country are the trichina and the cysticercus cellulosæ, the latter having been met with in the human subject, not only as the adult tinea, but also in the cystic form, all render the relations of veterinary to sanitary science so intimate that you will scarcely consider it presumption on my part to offer it as my opinion

that it is really necessary for the proper protection of the public that all animal food should be submitted to the inspection of qualified veterinarians.

Allow me to thank you, gentlemen, for having done me the honour of listening to this paper; and, in conclusion, to suggest that, from what has been said—and but for the already too great trespass on your attention, from much more that might be said—the time has surely come when the universities of this country might with benefit imitate the French, and institute a Chair of Comparative Pathology.

In 1881 the celebrated veterinarian, the late Professor Bouley, who at his death occupied the distinguished position of President of the French Academy of Sciences, gave his inaugural address on Comparative Pathology; and the no less distinguished veterinarian, Professor Chauveau, who succeeded him as Inspector-General of the French Veterinary Schools, now fills the Chair of Comparative Pathology at the Museum of Natural History in Paris.

The inauguration of chairs of this kind, and the modification of the laws interfering with pathological investigations, would greatly assist in elucidating many points bearing directly and indirectly on the public health, and far more than repay for the sacrifice of the life of some of the less important of our animals.

THE EXTINCTION OF CONTAGIOUS PLEURO-PNEUMONIA AND SWINE PLAGUE.

An influential deputation, representing the Royal Agricultural Society, the Smithfield and Farmers' Clubs, and the Central Chamber of Agriculture, waited upon Lord John Manners at the Privy Council Office on December 9th to urge upon the Council the necessity for taking rigorous measures to stamp out Pleuro-pneumonia and Swine Fever. Among the gentlemen composing the deputation were Earls Spencer, Feversham, and Jersey, Viscount Ebrington, Mr. Henry Chaplin, and Mr. C. W. Gray, Members of Parliament. Lord Feversham introduced the deputation. He was of opinion that rigorous slaughter could alone put a stop to these diseases in this country. Not only the animals affected, but those which had been brought in contact with the infected animals should be killed. Mr. Duckham employed similar terms, and remarked that one animal had been sufficient to spread the disease in the United States. Mr. Jacob Wilson, in the absence of Sir Matthew White Ridley, spoke on behalf of the Royal Agricultural Society. He cited the example of America and Denmark as one which should be followed by this country. At one time Denmark suffered more than any other country from Pleuro-pneumonia; but to-day, thanks to the vigorous methods adopted, there was not a single case in the peninsula. Lord Jersey handed in a resolution from the Central Chamber of Agriculture supporting the deputation. He trusted that steps would be taken to induce the authorities in Ireland to be more stringent in the application of the regulations with regard to diseased cattle. Mr. Howard presented a resolution from the Short-horn Society; and other gentlemen having spoken, Lord John Manners replied. Apologising for the absence, on account of a long-standing engagement in the country, of Lord Cranbrook, he said he was fully aware of the disastrous effects of the disease complained of, and he fully sympathised with and shared the views of the deputation. The Privy Council were actively in correspondence with the Irish Privy Council, and nothing should be left undone by the English department to bring the regulations in Ireland into conformity with those of this country. His earnest hope was that, before the winter was over, steps would be resolved upon which would effectually stamp out the plague. The deputation thanked Lord John Manners, and withdrew.

PRESENTATION TO PROFESSOR MACQUEEN, F.R.C.V.S.

On the 13th December, in the Langham Hotel, Buchanan Street, the students of the Glasgow Veterinary College met to do honour to Professor Macqueen, on the occasion of resigning his position at the college, which he has held for upwards of ten years. Professor Limont, M.A., M.B., presided. Messrs. Begg and A. Macqueen were vice-chairmen.

During the evening Mr. M. Graham, in an appropriate speech on behalf of his fellow-students, made the presentation. This consisted of a large case of instruments and a massive gold pendant from the students, and of a magnificent illuminated address from the Glasgow Veterinary Medical Association.

The address bore the following inscription:—

"To James Macqueen, F.R.C.V.S.

"Sir,—On behalf of the members of the Glasgow Veterinary Medical Association, on the occasion of your leaving the Glasgow Veterinary College, we desire to express the admiration and goodwill you have generated in this Association.

"As chairman of the meetings of this Society, you spared neither time nor energy, and discharged the duties with ability and fairness. And, in your judicious and clear summing-up of the discussions, you gave us much valuable information in a happy way, and at a time when its significance was clear to all present. Your career in connection with the Glasgow Veterinary College has been a long and honourable one.

"As Lecturer on Anatomy for so many years, you will be long remembered for the clear, decisive, and accurate style which characterised your lectures, and for the valuable aid you afforded to students in the dissecting-room. We have all, whether past or present students, to gratefully acknowledge what we owe to your work in this department.

"Of you, as Lecturer on Materia Medica and on Morbid Anatomy, much might be said, but the success of your students at examinations has shown the ability with which you taught these subjects.

"In clinical teaching, your professional skill and manner of imparting information to pupils, and the watchful guidance of us in the many operations done under your eye, have been highly appreciated and acknowledged by all.

"In private, to those of us who have had the privilege of knowing you, friendly intercourse with you has always been an experience of the most genial and genuine character.

"You have the good wishes of this Society in the new sphere upon which you are about to enter.

"May you long be spared to further the cause of a noble and useful profession.

"Signed, on behalf of the above-named Association, by Principal McCall, Professors Cooke, Limont, and Tweedley; Messrs. Begg, Renfrew, Houston, and A. Macqueen, veterinary surgeons, and by thirty-three students, representing office-bearers and members of the committee."

Professor Macqueen returned thanks in suitable and becoming terms, and gave a most interesting sketch of his career prior to entering the college.

By song and sentiment many contributed to make a very enjoyable evening, and one that is likely to be remembered by all who were present, for many years to come.

INSTRUMENTS AND APPLIANCES.

We have great pleasure in calling the attention of the veterinary profession to Messrs. Swift and Son's new bacteriological microscope, which is also well suited for other histological work. It has a good coarse focussing adjust-

ment by rack and pinion, and an improved fine adjustment; it is fitted under the stage, with a tube for the reception of a condenser, spot lens, and polariscope, and the stand is solid and firm in construction. There are two eye pieces and an inch and one-twelfths homogeneous immersion objectives, and an Abbe's condenser. We have carefully compared the one-twelfths objective with several sold by other makers, and find that it does more than hold its own. In fact, it is as good as a Zeiss one-twelfths old formula, which costs £15 15s. For all-round work a good one-sixth objective might be added.

We strongly recommend those gentlemen who wish to keep up with the times, to pay a visit to Messrs. Swift's establishment in Tottenham Court Road, where they will get full value for their money.

Reviews.

SOUNDNESS AND AGE OF HORSES. By M. HORACE HAYES, M.R.C.V.S. (London: W. Thacker and Co. 1887.)

In this addition to his numerous popular books on horses, Captain Hayes has ventured to offer to the public a veterinary and legal guide to the examination of these animals for soundness, and also furnishes information with regard to ascertaining their age by inspection of the teeth. In the preface, the author informs us that his object in writing the book has been: (1) To define, from a strictly legal point of view, what is meant by the term "soundness"; (2) To furnish a guide, as to procedure and detail, to the examination of horses for soundness; (3) To supply, as far as possible, references to decisions in Court on the subject, with appropriate quotations; (4) To separate those diseases, alterations of structure, and other defects that might be considered in themselves absolute unsoundness, from those which, from their position or degree, may or may not be unsoundness—judicial rulings being accepted when found to apply, and veterinary opinions when these did not serve; (5) Hereditary diseases; and (6) To discuss the question of age in its relation to examinations. In treating of the latter, acknowledgment is made of indebtedness to the excellent work of MM. Goubaux and Barrier on l'Extérieur du Cheval.

All these different points are dealt with in 110 pages, the remainder of the book being made up of drawings of the teeth at different periods of life; and so far as space allowed, the author has done well in his treatment of each of the sections. The subject is a very important, but at the same time a very intricate and difficult one to handle satisfactorily, and we think that Captain Hayes is entitled to much credit for the explicit and sensible manner in which he has discussed the many questions—some of them extremely vexed ones—which pertain to soundness and unsoundness of horses. We have not space to comment on some of his conclusions, but we may remark that with nearly all of them we agree.

We are glad to notice that he dissents from the notion that bent forelegs are always the result of previously existing pain in them or the feet. There could be no greater error than this; for it is the fact, as veterinary

surgeons of experience and observation will testify, that the greatest proportion by far of these bent limbs is due to severe work and very seldom to pain. Many of our best racehorses have their fore-legs somewhat bowed, but this is usually congenital; while some of the safest and best hunters have the same kind of limbs. Indeed, trainers and horsemen generally prefer this condition to the opposite—the calf knee, which Captain Hayes has not alluded to. Such limbs should not, we think, be considered unsound, if free from disease.

A Manual of Comparative Anatomy of the Domesticated Quadrupeds. By N. Hormasji Edalji Sukhia. (Bombay: Anglo-Jewish and Vernacular Press. 1887.)

We have had occasion several times recently to remark on the rapid progress veterinary medicine—or at least its literature—is making in India, the number of books on it published within the last few years by army veterinary surgeons stationed there being somewhat phenomenal, when compared with the little that was done in this way in preceding years. Hitherto the writers have been Englishmen, who wrote their treatises either in their own language or in one of the languages of the country. Now we have the educated native entering the literary arena, and giving us a book, not in his own familiar (though to Western peoples, strange) typography, but in good scientific English. Sahib Edalji Sukhia is a licentiate in medicine and surgery of Bombay, was for some time officiating surgeon to the Ratnagiri Civil and Leper Hospital, and has also been medical attendant to the deposed king of Burma, Theebaw, and suite. He is now an assistant surgeon in the Bombay Medical Department, and Demonstrator of, as well as Lecturer on, Anatomy and Physiology at the Government Veterinary College in that Presidency.

The little manual he has produced does not deal with the whole subject, but only with the bones, muscles and articulations, and is adapted more especially as a hand-book for his students. To such it will no doubt be found very useful, as the descriptions are brief and clear, the arrangement good, and the tables well calculated to render important service, with a minimum of trouble to the junior student. There appear to be remarkably few inaccuracies, and we must sincerely compliment the author on his meritorious achievement. Doubtless we shall soon have other works from him and his compatriots, and with their aid we shall make rapid progress in learning all that is at present unknown to us with regard to the diseases affecting animals in India, and especially in assisting us in removing those native prejudices which operate so perniciously in maintaining the destructive plagues that cost that country at least six millions of pounds annually. We shall heartily welcome as colleagues men of the stamp of Doctor Sukhia.

Vaccinia and Variola: A Study of their Life History. By J. B. Buist, M.D., F.R.S.E. (London: J. and A. Churchill. 1887.)

This is an attempt to determine the bacteric form in which the contagium of Vaccinia and Variola exists, in the materials which are capable of reproducing these diseases by inoculation, by employing the most

modern methods adopted in bacteriological research. The author's experiments are very interesting, and afford evidence of protracted labour patiently undergone; but they will chiefly concern those men who devote themselves specially to the subject of bacteriology and the *contagia vivum*. It may be mentioned that Dr. Buist concludes, from his investigations, that the bacteric form of the true vaccine contagium is to be seen in the minute isolated spores of micrococci which are found suspended in standard vaccine lymph; that, owing to stored lymph undergoing acid fermentation when not preserved in a dry state, the opinion may be suggested that this contagium is a vegetable ferment which has become acclimatised in warm-blooded animals; and that the pathogenic properties of the vaccine and variolous materials depend on the embryonic and mature forms of bacteria which they contain.

The author appears to accept the view entertained by so many medical men in this country, that Vaccinia is merely modified Variola; but all his experiments—cultivation and inoculation—though he does not see it, in our opinion disprove the statement. Nowhere has he, or for that matter anyone else, shown that Vaccinia can be converted into Variola. Until that can be done, we are justified in retaining the opinion which we were the first in this country to enunciate, that Variola and Vaccinia are as distinct diseases as Vaccinia and Variola Ovina are, and that the one cannot be transformed into the other. Indeed, Dr. Buist himself speaks of them as two diseases.

FLAGELLATED PROTOZOA IN THE BLOOD OF DISEASED AND APPARENTLY HEALTHY ANIMALS.* BY EDGAR M. CROOKSHANK, M.B. Lond., F.R.M.S.

In a pamphlet of about sixteen pages, Professor Crookshank—after referring to the discoveries by Mitrophanow of the Hæmatomona carasii in the blood of the carp, and the Hæmatomona cobitis in that of the mud-fish; by Lewis, of a parasite in the blood of the Indian rat; and by Evans, of the "Surra parasite"—proceeds to record the result of examinations of the latter, as shown in slides lent by Dr. Evans. He examined them with 1-12 and 1-18 oil imm., and says, "These are quite sufficient at once to dispel the idea of its being a spirillum. It was obvious that it was a more highly-organized micro-parasite, presenting very peculiar and distinctive structural appearances." The author also gives the results of his work with the blood of the common brown rat of England. In twenty-five per cent. of apparently healthy animals, he found a parasite morphologically identical with that of Surra and an encysted and angular form. From our general knowledge of the life-history of the Monadinæ, it is not improbable that the two latter are immature forms of the former, but their connection has not been demonstrated, so far as we are aware. The rodent host, as Professor Crookshank very rightly observes, is in *apparent* health, but the monads are present in such swarms that we cannot refrain from the thought that they must exercise a deleterious effect.

* Reprinted from the Journal of the Royal Microscopical Society.

Professor Crookshank recommends the following provisional classification :—

Genus—Trichomona; sub-genus—Trichomona sanguinis; species—T. cobitis (mud-fish); T. carasii (carp); T. Lewisi (rat, hamster); T. Evansii (horse, mule, camel).

The author illustrates his text with a series of good photographs of the Surra parasite, and well-executed woodcuts of the other monads referred to.

The subject is well treated, and the paper is very readable, and would interest those even whose labours are not specially connected with this department of biology.

Proceedings of Veterinary Medical Societies, &c.

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION.

A MEETING of the above Association was held at the First Avenue Hotel, London, on 25th November, 1887, Sir Henry Simpson, J.P., Windsor, President of the Association, in the chair.

There were also present—Professor Robertson, Messrs. Wragg, Sheather, Pritchard, and Villar, London; Flanagan and Wheatley, Reading; Simpson, Maidenhead; Walker, Oxford; G. A. Lepper, Aylesbury; Barford, Southampton; Walker, 1st Life Guards; Raymond, A.V.D., Woolwich; Wilkins, Lambourne; Jones, Leicester; Hunt and Howard, Newbury; Slocock, Hounslow; C. N. Page, Banbury; Oatway, Great Stanmore; Darling, Brucknell; Wilson, Berkhampsted; and Kidd, Hungerford.

The following gentlemen were present as visitors :—Messrs. J. Roalfe Cox, W. Hunting, C. Lowe, W. J. Roberts, J. E. Jarvis, N. Legg, and J. Rowe, London; J. Fraser, Bromley; and F. Samson, Mitcham.

After the minutes of last meeting were read and confirmed, Messrs. W. J. Mulvey (London), E. Langford (Shaftesbury), and F. T. Catway (Great Stanmore), were unanimously elected members of the Association.

Mr. WALKER (Oxford), Hon. Treasurer, submitted the statement of accounts for the past year, which showed the Association to be in a flourishing condition.

The following office-bearers were unanimously elected for the ensuing year :—President, Mr. F. W. Wragg, London; Vice-Presidents, Mr. G. A. Drewe (Abingdon), Mr. A. Wheatley (Reading), Mr. W. Wilson (Berkhampsted), and Sir Henry Simpson (Windsor); Hon. Treasurer, Mr. J. P. S. Walker, Oxford; Hon. Secretary, Mr. H. Kidd, Hungerford.

The next meeting will be held at Reading on the last Friday in February.

Mr. F. RAYMOND resumed the discussion on the lecture given by Professor Robertson at last meeting on "Inoculation as a Preventive against Pleuro-pneumonia." He said: Although Army veterinary surgeons in England had very little to do with cattle, when they were on foreign service they saw a great deal more of epizoötic disease than they liked. During the Egyptian campaign Cattle-plague broke out at one of the ports on the coast, and it was only through the skill and energy of Mr. Rayment, who was now in India, that it was stopped. The most important part of the inspection connected with epizoötic diseases in the up-country in India was entirely in the hands of members of the Army Veterinary Department, who, therefore, saw the diseases on a scale which far exceeded anything that was likely to be met with in England, though it was impossible for them to have the same

knowledge of special animals as many of the cattle inspectors in this country had. The question of Pleuro-pneumonia had greatly increased in public interest since the last meeting. A very important deputation had waited on the Privy Council, and even in Ireland inquiries were beginning to be made. The Committee on Agriculture of the Royal Dublin Society had appointed a sub-committee to investigate the conditions under which live stock were sent from Ireland, and to inquire into the alleged prevalence of Pleuro-pneumonia. The Association might, therefore, take the opportunity of drawing the attention of the profession and the public to the matter by passing a resolution in favour of wholesale destruction or inoculation, or both, as the case might be. Professor Robertson had said that "facts appear to indicate that protection can be afforded by inoculation." That was a very cautious remark, and most people who had gone into the statistics would be able to take a more positive stand. There could not be the slightest doubt that inoculation had a great effect in causing immunity from the disease. Of course Professor Robertson was careful in his expression, as a man ought to be who might at any time be called upon to institute a scientific inquiry. He was quite right not to bind himself in any way; but an ordinary veterinary surgeon would have no hesitation in saying that inoculation was a great preventive. Another remark in the paper was that "from evidence produced there does not seem to be much danger from contamination." That was a subject on which he had not been able to satisfy himself. It might be of great interest if the members of the Association would record their experiences as to whether, when a healthy animal had been inoculated for Pleuro-pneumonia it could be safely sent into a herd of healthy cattle without causing an outbreak of disease. Before a Commission in South Africa, in 1877, a case was reported of an ox which had apparently recovered from a slight attack of the disease, but communicated it to a herd year after year for three years. Professor Robertson advocated inoculation with modified virus, and he (Mr. Raymond) agreed with him. Professor M'Call recommended inoculation of calves, and said that one attack rendered the animal free for the future. Professor Walley, on the other hand, held the opposite opinion. When professors of such eminence differed, who was to decide? A gentleman in South Africa, who inoculated 900 cattle in about ten years, found that the ratio of loss from inoculation was 1·34 per cent. Recently, in Belgium, Poels and Nolen succeeded in isolating the microbe of Pleuro-pneumonia, and inoculated at least 100 cattle, of which none died, although in a suspected locality. They say, "Altogether we inoculated eight hundred cattle, some with lymph before coagulation could take place, others with the coagulum which afterwards forms in the lymph, and the results were unusually favourable, as, with very few exceptions, the inoculation took in all cases. On the other hand the action of perfectly transparent serum is known to be very irregular; with many animals it fails of effect, and in others considerable swellings are produced. The explanation of these various effects appears to be as follows:—As before stated, the clear serum contains extremely few micrococci of Pleuro-pneumonia, and for this reason inoculations done with it very often fail of their proper effect, while the other micro-organisms present in the serum (bacilli among others) produce unhealthy results. The favourable results of our inoculation of eight hundred animals, in almost all of which local reaction followed without a higher death-rate, show the correctness of this explanation." He, himself, was strongly in favour of stamping out the disease, but science had made such great advance during recent years that an inquiry ought to be instituted into the effects of inoculation, with pure cultivations of the virus. If that were done, in addition to stamping out, he believed the disease would be eradicated in Great Britain.

Mr. KIDD said he had had large experience with Pleuro-pneumonia. In

two outbreaks—one herd over one hundred and thirty head and the other over eighty head—he had administered medicine internally with most satisfactory results. With regard to inoculation, the inference which he drew from the experiments of scientific men in this and other countries was that inoculation was not sufficient to arrest the spread of Pleuro-pneumonia, and so far as Great Britain and Ireland is concerned, this disease should be stamped out. The veterinary profession has been twitted with inability to eradicate it from our country; in this it is unjustly reproached, for an opportunity of trying has not been extended to it. The Legislature has had twenty years' trial, with two Acts of Parliament, and it has failed to extirpate Pleuro-pneumonia, the disease being more prevalent and widespread at the present time than it has been for a number of years, and under the Contagious Diseases (Animals) Act of 1878, Pleuro pneumonia cannot be effectively stamped out, because the legislative machine is too clumsy, and its lever requires too much force to set the machinery in motion. He said he was convinced that the Legislature could not stamp out Pleuro-pneumonia without the aid of the qualified veterinary surgeon. It is absolutely necessary to have uniformity of action, not only in counties and boroughs, but also in the three countries. This would enable those in authority to grapple with a fresh outbreak, prevent its spread, and minimise the losses and hardships which are entailed under existing laws. Imperfect disinfection has played a most important part in the spread of this and other contagious diseases, and if Pleuro-pneumonia should ever be stamped out of our country, if thorough disinfection be not rigidly and effectively adopted, this disease will be sure to break out in fresh herds, if put into sheds where the disease had been. Mr. Kendal, M.R.C.V.S., advocated inoculation very strongly before the National Agricultural Society of Victoria recently, and said, "Whenever inoculation has failed to check the disease the failure has been due to bad virus, or the operation has not been properly performed. If every herd in which the disease breaks out were to be properly inoculated, he believes the country might be freed from the disease in two or three years," but he (Mr. Kendal) in his next sentence proves that inoculation *alone* cannot possibly rid Australia of Pleuro-pneumonia, where he says, "If there is one thing proved in regard to Pleuro-pneumonia, it is the fact that any beast which has once had the disease is never afterwards safe from communicating it." The same remark may safely be applied to inoculation in our own country. Professor Brown, in a recent Veterinary Report, says, "that in countries where inoculation is most extensively practised, Pleuro-pneumonia is always most rife, and that no country has yet been successful in getting rid of the disease by the aid of the supposed preventive."

Mr. SAMPSON said he had inoculated cows for many years, and he did not see any good in using modified virus. Great strides had been made in the way of inoculating. Some two years ago great pieces of flesh were put into the cow's tail after it was incised, and in those days the loss amounted to 20 or 25 per cent. When, however, the worsted thread soaked in the virus (which should be perfectly fresh) was used there were no ill-effects. The plan followed by the Government was quite useless, and would never stamp out the disease, any more than Glanders had been stamped out. He recommended his clients when they bought stock to put them on a separate farm for a month or six weeks, and have them inoculated before they were put into the shed. A better plan still would be to inoculate them when they were two or three months old. He had never found a cow placed in a shed after inoculation to be infected by the disease. If there was the least trace of the disease in the system the inoculation was of no use in preventing its development; but it would bring it out quicker, and, therefore, when he was called in he generally inoculated the whole stock.

Mr. W. HUNTING considered that the Act of Parliament, so far as Pleuro-pneumonia went, was a failure. The reason local authorities did not carry it out was that they did not understand it, and did not like to pay the heavy bills; but when veterinary surgeons made up their minds as between inoculation and stamping out, stockowners would follow their advice. He believed that the majority of the profession were of opinion that if proper effective stamping out measures were adopted, Pleuro-pneumonia would completely disappear. It was extremely interesting to know whether or not there was a bacillus in it, but from a sanitary point of view that was not a very important matter. What was wanted was to decide which was best, to trust to stamping out, or to combine that with inoculation. Inoculation misled by setting up an unreliable protection, and thereby prevented the carrying out of an effectual remedy, namely, the pole-axe applied to every affected animal, and those that had been in contact with them. He would like to ask if a case of Pleuro-pneumonia ever recovered, as proved by a *post-mortem* examination some time afterward. He fancied that it never did, and that an animal which once suffered from it was always a possible centre of contagion. Great Britain being an island, they could almost make sure that it should not be imported from the Continent, but Ireland was the great difficulty. Importation from one country to another could be forbidden, and surely there would be no hardship in stopping the importation from Ireland until the disease was got rid of there.

Mr. VILLAR said that no matter how inoculation was performed, a certain percentage would die; some would be ill for weeks, and nearly all would go off their feed. He always used a bit of fine tape which had been saturated with the fluid from the lung, but he took good care to get a portion of lung from a young animal, and the operation was, as a rule, successful.

Prof. PRITCHARD said that they must all remain in a difficulty with regard to the results of inoculation as a prophylactic in the case of Pleuro-pneumonia, until they could say something positive as to the period of incubation, and no man living could do that. One burning question was whether the shed in which a diseased animal had been placed was a medium of communication. He was inclined to think it was not. If it was not, then stamping out Pleuro-pneumonia in this country was simply a matter of expense, and could be done in a very short time. There was no proof that the disease could be communicated by the shed. So far as he could gather, in order that an animal might take the disease, it must have been in contact with one that had been affected. If it was simply a question of stamping out, he would rather destroy 200 sound animals than let one that was diseased escape. In inoculation some little care must be taken in obtaining the virus, and in performing the operation. If an animal which had never been in contact with others that were diseased was inoculated, the virus acted as a prophylactic; but who could say that there had been no such contact?

Mr. LEPPER said he had seen an enormous amount of Pleuro-pneumonia, and the conclusion he had come to was that there was nothing better than stamping it out. Inoculation, in his opinion, held out a false hope. Recently, close to Aylesbury, Pleuro-pneumonia appeared in some animals, and they infected other herds. The remainder were killed, and for the last two months there had been no fresh cases. He would be very loath to put healthy animals into a shed in which diseased animals had been kept, for he was satisfied that he had seen the disease spread in that way. He thought that the authorities in a district where it broke out ought not to be saddled with the whole expense of stamping out. As it was done for the good of the country at large, the money ought to come out of the imperial taxes.

Prof. ROBERTSON, in reply, said that though inoculation originated and was still carried out in Belgium, Pleuro-pneumonia was always in the ascendant

there, and the same might be said of England, Scotland, and other countries where inoculation was extensively practised. Theoretically, inoculation might be correct; practically, it was not. From his own experience he should not fear to place healthy animals in a shed where disease had existed. He was thoroughly of opinion that the only way of exterminating Pleuro-pneumonia was by slaughter, not only of the diseased animals, but of those herded with them. If inoculation was adopted, the cattle should be surrounded by a cordon, and prevented from leaving the locality.

The PRESIDENT said he considered himself fortunate that during his year of office such a discussion had arisen. No doubt the phases which such subjects underwent were varied and very often rapid. Because this one or that one held a positive opinion on a particular subject, it did not follow that that subject was thrashed out, and that others should sit down and accept any one's dictum. In fact, scientific men who had the strongest views on any given point were the first to admit that their opinion did not settle the question. Strong opinions had been expressed, both for and against inoculation, but the greatest opponent of inoculation would hardly attempt to deny that to a certain extent when an outbreak did occur the mortality was very much diminished if inoculation was put into practice. He thought the time must come when the subject would be investigated more fully, and when they would either utterly discard inoculation or believe in it, and decide that every animal should be inoculated as soon as it was old enough to stand the effects of it. He thought they were all very much indebted to Professor Robertson for his kindness in going, first of all, to Windsor to deliver the lecture, and then attending the present meeting to finish the debate. He proposed a cordial vote of thanks to Professor Robertson, which was unanimously carried.

Professor ROBERTSON, in acknowledging the vote, said he felt gratified if anything he had done had helped to render the meetings of the association agreeable and pleasant.

The PRESIDENT then moved the following resolution: "That the Royal Counties Veterinary Medical Association desires to thank the Royal Agricultural Society of England for initiating experiments with regard to Symptomatic Anthrax."

Mr. WRAGG seconded the resolution, and it was unanimously agreed to.

Mr. J. ROALFE COX exhibited a morbid specimen of Sarcoma affecting the jawbone of a horse, and gave a lucid description of its appearance, growth, and treatment.

Mr. WHEATLEY exhibited a tumour from the right ventricle of the brain of a mare, which weighed 1¾ ounces. He also exhibited specimens of calculi from sheep.

A cordial vote of thanks was passed to Mr. Roalfe Cox and Mr. Wheatley for their interesting specimens.

On the motion of Mr. WILSON, seconded by Professor PRITCHARD, a hearty vote of thanks was passed to the retiring President for the very able way in which he had presided over the Association during the past year.

Sir HENRY SIMPSON, in acknowledging the vote, congratulated the members upon the vitality of the Association and the good that it was doing.

H. KIDD, *Hon Sec.*

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

THE usual quarterly meeting of this Association was held in the County Hotel, Newcastle-on-Tyne, on Friday, November 25th, 1887, the President, Mr. D. Dudgeon, in the chair.

Present:—Professor Williams; Messrs. Nisbet, Fence Houses; J. Gofton, North Shields; D. McGregor, Bedlington; Gresty, Beamish; W. Wheatley,

South Shields; Stevenson, Whitburn; G. R. Dudgeon, Sunderland; W. A. Hancock, J. W. T. Moore, G. Elphick, H. Hunter, and the Secretary, Newcastle-on-Tyne.

Visitors:—Messrs. Bell, Carlisle; Cameron, Berwick; Bennett and Charlton, Newcastle-on-Tyne.

The minutes of the last meeting were taken as read.

Letters of apology for non-attendance were received from Professors Robertson and Walley; Messrs. C. Stephenson and G. R. A. Cox, Newcastle-on-Tyne; Thos. Greaves, Manchester; T. Briggs, Darlington; F. R. Stevens, Darlington; and W. J. Mulvey, London.

The SECRETARY then read the following letter:—

Royal College of Veterinary Surgeons,
10, Red Lion Square, W.C. *Oct. 20th*, 1887.

DEAR SIR,—I am directed by the Council to officially acknowledge the receipt of your communication of the 9th June last, and to ask you to be good enough to thank the members of your honourable Society for their suggestions in regard to the examiners and examinations of this College.—I am, dear sir, yours faithfully, ARTHUR W. HILL, *Sec.*

A. Hunter, Esq., *Hon. Sec.*
North of England Veterinary Medical Association,
New Bridge Street, Newcastle-on-Tyne.

The following members were then unanimously elected office-bearers for the ensuing year:—Mr. D. Dudgeon, President; Messrs. J. Gofton and H. Hunter, Vice-Presidents; Secretary and Treasurer, Mr. G. R. Dudgeon, Sunderland; Auditors, Messrs. Moore and Hancock.

At the request of the President, Professor WILLIAMS opened out the adjourned discussion on his paper. He said, since the last meeting, several cases had occurred which quite bore out the opinion he had formed from previous experience as to the advantage of the treatment he advocated.

Mr. BELL, Carlisle, said, since he listened to Professor William's paper, he had had a very painful experience of the advantages of Professor William's treatment in his own person. When casting a horse for an operation he unfortunately got his finger fast in the chain of the hobbles, and it was very seriously damaged, the bone being exposed and the joint opened. The surgeon wished to amputate the finger at the first joint, but he objected, and suggested that the treatment recommended should be tried. This was done, and the wound healed very quickly, and he suffered very little pain after the first night, but unfortunately the joint remains stiff.

A lengthened discussion followed, in which most of the members present took part, after which the PRESIDENT and Mr. H. HUNTER introduced the question of cruelty to animals. The former more particularly alluded to the interference of the Society's officers with cases under the treatment of veterinary surgeons who may have ordered exercise or light work as conducive to their recovery. Special reference was made to a case in Sunderland in which Mr. Meikle, veterinary surgeon, was summoned, and the case dismissed, as the magistrates decided, without hearing the defence, that there was no case against the defendant, and yet on application they refused to allow costs against the Society. It was unanimously decided that in the great majority of these cases the interference of the Society was uncalled for, and even, from the Society's point of view, undesirable.

Mr. H. HUNTER then introduced the question under the following heads, and while admitting that the Society had effected a great deal of good, it was contended that, as at present administered, very great hardship and injustice was inflicted on poor people for very trivial offences, if offences they could be called:—

That the intention of cruelty was not taken sufficiently into account, and in many cases where there had been an evident effort to prevent any cruelty, convictions had taken place.

That in many cases convictions had taken place against the weight of evidence, and even when the veterinary surgeon of the Society had given evidence against them; also in a recent case when the Society's veterinary surgeon refused to appear for them, the officer proceeded with the case, which was dismissed, but yet cost the defendants about £5.

That in all cases there should be power of appeal, and in cases dismissed costs should be given against the Society.

That in many cases the evidence of the officer and policeman are greatly exaggerated.

That magistrates who are members of the Society should not adjudicate on cases of alleged cruelty.

That the time which elapses between the alleged cruelty and the issue of the summons should not exceed two or three days.

That the question often put to veterinary surgeons as to whether they would swear that an animal suffered no pain was unfair and misleading, as it was quite possible for an animal to suffer a certain amount of pain, and yet not be cruelty.

A good discussion ensued, and it was unanimously resolved that Messrs. Dudgeon and Hunter should consider before next meeting what steps should be taken to bring the views of the members of the Association before the public.

After a vote of thanks to the President and Secretary the meeting terminated.

A. HUNTER, *Hon. Sec.*

ONTARIO VETERINARY COLLEGE.

THE session of 1887-88 opened on October 26th, showing no diminution of interest from the sessions of former years.

For several days previous to the formal opening, the matriculation examinations were in progress. Students presented themselves in large numbers and from all parts of the American continent. Marked improvement was shown in the general education of the candidates, a large majority being successful—passing generally with credit to themselves.

Professor Smith, Principal of the College, delivered the opening lecture. He had fully intended at the close of last session to proceed with the erection of new buildings during the summer. The plans were all prepared and ready for the contractors, but the unfortunate strikes had destroyed all hope of proceeding with any extensive building operations for the past season. In order to accommodate the classes, a large hall had to be found, as the hall used last year is now inadequate. Fortunately, Richmond Hall, within easy distance of the College buildings, was secured. This forms a light and pleasant auditorium, capable of accommodating between four and five hundred students.

The Chair of Physiology, vacant by the lamented death of Dr. Barrett during last session, has been filled by the appointment of Dr. Peters, Demonstrator of Anatomy in the University Medical College. Dr. Peters enters upon his work with enthusiasm, and will prove a great addition to the strength of the College staff.

A new Chair, that of Pathology, has been established, which will prove to be of benefit to those studying the subject. Not only will the latest and best work of other pathologists be presented to the students, but original investigations will be carried on with special reference to the needs of veterinary science. It is proposed to give prominence to this subject, and Dr. Cavan,

who is admirably qualified for the work (having made a special study of it in Germany), has been appointed to this department.

Professor Ramsay Wright, of University College, will give this session a special course of lectures on bacteriology—a course similar to that which was so popular last session. In every department of the College work is progress and advancement to be noted. A larger number of students form the first year's class than on former occasions.

PATHOLOGICAL SOCIETY OF LONDON.

Avian Tuberculosis.

At the meeting of the above Society, held on December 6th, Mr. W. Sibley read a paper on an Epizooty of Avian Tuberculosis in a farm in Surrey, and showed specimens of the various organs diseased. Much caseating matter was expelled from the bowel, after having been discharged into its lumen from the diseased walls of the intestine, and thus left behind large pouches. The lesions presented the typical forms of bacilli. The disease generally appeared when the birds were about two years old. The whole of the abdominal organs were affected. Mention was made of one such pouch connected with the crop which attained the size of a pigeon's egg. Subpleural nodules were also present, and the larynx and trachea were diseased. Vertebral caries and caseating cervical glands were occasionally observed. Bacilli, apparently identical with those found in human Tuberculosis, were present in most of the affected organs. The nodules appeared to have little tendency to break down, but the growths tended to spread and to caseate, forming relatively large tumours. The disease was apparently an example of hereditary transmission.

ROYAL AGRICULTURAL SOCIETY.

At the monthly Council Meeting, held on December 7th, Sir John Thorold (chairman) presented the following report, which had been received from Mr. Cope of the Agricultural Department of the Privy Council Office:—

Pleuro-pneumonia was widely spread throughout Great Britain during the first nine months of this year. In Scotland the losses were very considerable, amounting to upwards of 1,240 animals. The disease was most prevalent in the county of Lanark, where no less than 349 animals were reported to have been attacked. Serious losses also occurred in the counties of Edinburgh, Fife, Forfar, and Perth. In England the disease was far less rife than in Scotland, the number of cattle reported as attacked being about 820. The following are the counties in which Pleuro-pneumonia was most prevalent:—Middlesex (including the metropolis), West Riding of Yorkshire, Lancashire, and Essex.

Swine Fever has continued throughout the year, and was very extensively prevalent during the summer. Since the commencement of October there has been a gradual decline in the disease, and the number of outbreaks, which in the four weeks ending October 29th amounted to 412, has decreased to 296 in the four weeks ending November 26th. The counties in which Swine Fever existed during the year to the greatest extent were Hants, Lancaster, Norfolk, Northampton, Somerset, Stafford, Suffolk, Wilts, and the West Riding of Yorkshire.

Anthrax.—Numerous outbreaks of Anthrax were reported during the nine months of the year, and the disease appeared in the following counties:—Berks, Bucks, Cambridge, Chester, Cornwall, Cumberland, Derby, Devon, Dorset, Durham, Essex, Hants, Hereford, Herts, Hunts, Kent, Lancaster, Leicester, Lincoln (Holland), Lincoln (Kesteven), Lincoln (Lindsey), Norfolk, Northampton, Northumberland, Notts, Oxford, Rutland, Salop, Somerset,

Stafford, Suffolk, Sussex (East), Warwick, Wilts, York (North Riding), York (West Riding), Isle of Ely, Pembroke, Aberdeen, Banff, Dumfries, Edinburgh, Fife, Forfar, Haddington, Lanark, Linlithgow. Total number of outbreaks in Great Britain during the nine months, 175.

Rabies.—Outbreaks of Rabies were reported from Chester, Derby, Dorset, Durham, Essex, Hants, Herts, Hunts, Kent, Lancashire, Leicester, Lincoln (Kesteven), Middlesex, Notts, Salop, Stafford, Surrey, Sussex (East), Sussex (West), Warwick, Westmoreland, Wilts, Worcester, York (West Riding), Soke of Peterborough, the Metropolis. An outbreak occurred among the deer in Richmond Park, which caused a loss of 257 animals.

Milk Scarlatina.—The inquiry into the nature of the eruptive disease of the teats of cows, which has been previously referred to under the heading of the Hendon Cow Disease, in connection with Scarlatina, has been actively carried on. Numerous outbreaks of the affection in different parts of the country have been investigated, and some important evidence as to the nature of the malady has been obtained. The investigations are not yet completed, but a preliminary report will be issued shortly.

The Committee had settled the regulations for the horse-shoeing competition, which they recommend should be held in connection with the Nottingham meeting next year.

The Committee had unanimously passed a resolution urging upon the Council to communicate at once with the Lord President of the Council requesting him to receive a deputation from the Society on the subject of the spread of Pleuro-pneumonia. The Committee asked for a renewal of the grant of £500 for the year 1888, of which sum they propose that £200 be granted on certain conditions to the Royal Veterinary College in aid of the further development of cattle pathology.

The Committee had met nine times, and made nine reports, and they recommended that the present members (with the exception of the Hon. E. K. W. Coke and Mr. A. P. Lloyd) constitute the Committee for the ensuing year, and that Mr. T. H. Miller be added to the Committee.

The Earl of FEVERSHAM announced that Lord John Manners had consented to receive a deputation from the Smithfield Club, in conjunction with any other societies that might wish to be represented, at twelve o'clock on Friday, as to the best means of stamping out Pleuro-pneumonia, now so disastrously prevalent.

Mr. DENT said he wished to know what the Council intended to advocate.

Mr. BOWEN-JONES said it seemed to him that now was the time for the Council to take very decided action, and they should endeavour to induce the Government to act through the Irish Privy Council, as Ireland was the seat of the disease. The Privy Council should order the slaughter of all animals infected with the disease, and if this were done, we should soon hear the last of Pleuro-pneumonia.

Mr. S. P. FOSTER pointed out that action should be uniform throughout the country, as it was of no use one county slaughtering infected animals if neighbouring counties did not do the same.

Mr. JOSEPH MARTIN concurred, and thought that the expense should be borne by the Imperial Exchequer.

Mr. J. HOWARD said the feeling at the Smithfield Club was unanimously in favour of setting aside the Local Authorities, and putting the responsibility upon the Government. In the Act of 1878, the Government have ample authority for dealing with the subject.

Lord EGERTON of TATTON felt that it was important that a resolution on the subject should be passed by the Council. He moved—

"That the Council desire to urge upon the Government the necessity of adopting uniform and stringent measures to stamp out all existing cases of

Pleuro-pneumonia in the country, by directing the slaughter of all animals suffering from the disease or in contact with other animals affected by the disease, and, as this action will be ineffectual unless a similar course be adopted in Ireland, to impress upon the Government the urgency of like action by the Privy Council in Ireland.

Mr. BOWEN-JONES seconded the motion, which was carried unanimously.

After some further discussion on the subject, in which Sir MASSEY LOPES, Mr. WAKEFIELD, Mr. BOWEN-JONES, and others took part, it was decided that a deputation from the Society wait upon the Lord President of the Council on Friday next, to lay before him this resolution, and to urge immediate attention to the matter.

A letter was read from the Worshipful Company of Farriers, stating that if the Society could see their way to carry out the practical examination of persons exercising, or intending to exercise, the trade of farriers, the Registration Committee of the Farriers' Company would be prepared to recommend to the Court of the Company that the freedom of the Company should be granted to those persons who successfully pass such examination.

It was unanimously resolved, on the motion of Mr. CLAY, that a special committee be appointed to consider the proposals in the letter of the Farriers' Company, and whether anything can be done to improve the scientific practice of horse-shoeing; and that such committee consist of Messrs Clay, Cope, Gorringe, Harpley, Miller, Muntz, and Sanday, with power to add to their number.

Notes and News.

INTERNATIONAL VETERINARY CONGRESS. — The fourth International Veterinary Congress, which was held in Brussels in 1883, decided that the next Congress should be held in Paris in 1889, during the month of September, when the Universal Exhibition will be held in that city. A committee has been already formed, of which Dr. Chauveau is president, to make the necessary arrangements.

MONUMENT TO THE LATE PROFESSOR BOULEY.—It has been decided that the monument to this most distinguished member of our profession shall be inaugurated in 1889, during the International Veterinary Congress, in order to give the ceremony more *éclat* and solemnity. It is to be placed in the centre of the space comprised between the students' quarters and the old dissecting-room in the Alfort Veterinary School, the face of the figure towards the hospital court. The monument is pronounced to be a veritable work of art, and the sculptor has been allowed the privilege of exhibiting it at the next Salon in Paris.

CONGRESS ON TUBERCULOSIS.—A Congress is to assemble towards the end of next July in the Paris School of Medecine, to discuss the more serious questions in connection with Tuberculosis. It will be composed of medical men and veterinary surgeons, and the committee appointed to organise it is formed by MM. Vernéuil, Villemin, Launelogue, Cornil, Grancher, Chauveau, Butel, Leblanc, Nocard, and Rossignol.

DIPHTHERIA.—According to the researches lately communicated to the Academy of Scfences by Dr. Teissier, of Lyons, the author believes that Diphtheria is, above all, an infectious malady, the germ of which, being transmitted through the medium of atmospheric dust, is absorbed through the respiratory organs. The dust emanating from manure heaps, collections of

rags or of straw, are particularly favourable for such transmission, as they constitute excellent media for the cultivation of the pathogenic germ. The pigeon and the common fowl seem to be the most active agents for the dissemination of the germs from these different infectious foci. Among the other cases which contribute to favour the receptivity of the germ, cold occupies the first place (79 out of 132). Dr. Teissier, however, remarks that the humidity of the air constitutes, without any doubt, a condition extremely propitious for the multiplication and dissemination of the germs of Diphtheria.

CONFINED AIR AND THE DEVELOPMENT OF PHTHISIS.—At a recent meeting of the Academy of Sciences of last week, Professor Brown-Séquard spoke upon a subject that he had commenced in 1869 to demonstrate—namely, the influence of confined air on the development of pulmonary Phthisis. The learned professor had performed experiments on a number of guinea-pigs, which he divided into two series. In the one series, after having inoculated the animals with tuberculous matter, they were placed in the most favourable conditions as to bedding, alimentation, and aeration. They lived at liberty under a shed opening into a garden, and where the bedding was frequently renewed. Not one of them (numbering more than a hundred) was affected by the inoculation. They manifested no sign of Phthisis, and remained perfectly healthy. The second series, however, which were inoculated in the same manner, but which were condemned to live in closed laboratories, where the air was confined, nearly all died from Phthisis.

RABBITS IN AUSTRALIA.—The offer of a prize of £25,000 by the Government of New South Wales to the discoverer of a means of killing the rabbits which are devastating the colony has attracted the attention of M. Pasteur. To-day he sends a letter on the subject to the *Temps*, suggesting ideas which he thinks may be found of use. Hitherto mineral poison has been employed to destroy the animals, but they increase with such frightful rapidity that poison has proved a very insufficient means of meeting the plague. What is wanted, M. Pasteur suggests, is a poison endowed, like the animals themselves, with life, and multiplying with similar rapidity. An attempt should, he thinks, be made to introduce a disease among the rabbits which would become epidemic. There is such a malady, known as the Hen Cholera, which has been carefully studied in his laboratory. This disease is common to poultry and rabbits. Among the experiments which he made was the following:—He shut up within a limited space a number of hens. He gave them food tainted with the microbe which is the cause of the Hen Cholera, and in a short time all of them perished. Sometimes poultry yards are devastated by epidemics of this kind, which spread, doubtless, through the tainting of food by the droppings of the first sick fowls. The same thing, he believes, would happen to rabbits, which, returning to their burrows, would there spread the disease. Nothing would be more easy than to communicate the disease to a few of the animals. Round a burrow M. Pasteur would place a movable fence, within which the rabbits would circulate in search of food. Experiments have proved that it is easy to multiply to any extent the microbes of Hen Cholera in all kinds of flesh soups. If the food of the rabbits were watered with these liquids full of microbes, the animals would catch the disease, and spread it everywhere. M. Pasteur adds that the disease of which he speaks does not attack four-footed domestic animals, and as fowls do not live in the open country, there would be no risk of destroying them.

REMOVAL OF THE UTERINE APPENDAGES OF A WOMAN BY A SOW-GELDER.—Mr. Arthur Thomson, of the Medical School, Oxford, sends the following extract from a book entitled, "Man Transformed," published in 1653, to the

British Medical Journal:—"It is an anatomical question, *an mulier castrari possit*, and it appeares, *de facto*, to have been done; but concerning the manner of operation there ariseth a great difficulty: whether they castrated women by drawing out their wombe, or by evulsion of their testicles. Both waies it is certaine that women will be brought into great danger of life; for although sows may be spaded, yet with the like security it cannot be administered in women by reason of the seat wherein they are placed, and the society they have with other parts, for he must necessarily cut both the flankes who would castrate a woman, a work full of desperate hazzard; yet it may be done with little or no danger if it be attempted by an artfull hand. And a friend of mine told me he knew a maid in Northamptonshire that was thus spaded by a sow-gelder, and escaping danger, grew thereupon very fat. A gentleman who undertooke since, in some company, to tell me this story, againe said he was present at the assizes of Northampton when this sow-gelder was arraigned for this fact. I doubt there was some mistake in the scene, for by another information, by a justice that was there, it was in Lincolnshire, and the fact done upon Lincoln Heath, and that was not his first fact, so that his first attempt might be upon the Northampton maid. This last maid's name was Margaret Brigstock; but the judges were much confounded how to give sentence upon an act against which they had no law; for, although the castration of men was fellony by the law, yet there was nothing enacted against spading of women; and well might they be ignorant of such a case when Platerus, the great physician, professeth he remembereth not that ever he read or heard of such an attempt. This Clearke (for that was his name) was hanged for this last fact, but not by a law, but for robbing her of two penniworth of apples which she had in her apron."

Long Existence of a Horse without Food or Water.—Mr. Arthur Passmore relates (in *The Field*) the following regarding a horse on his brother's estate at Tomé, in Chili. The animal disappeared and was thought to have been stolen, but—"The horse we thought was stolen has been found in our own place. The poor brute had fallen down the side of a hill, and had become entangled in coils of wild creepers, and was so tied up that it could not even lie down, and in this position it had managed to exist twenty-two days without food and without water, and when found was still alive. It is now making up for lost time in the matter of feeding, though at first it was too weak to eat anything."

Obituary.

THE close of 1887 has been marked by the removal from our midst of one of the most prominent members of our profession, whose presence will be greatly missed and his death deeply deplored by a wide circle of friends and colleagues. On December 15th, William Robertson, F.R.C.V.S., Professor and Principal of the Royal Veterinary College, was seized with a fit while engaged in his office, and in a few minutes was dead. This awfully sudden death, occurring on the very day the examination of his students by the Royal College of Veterinary Surgeons commenced, cast a most painful gloom over not only his college and those connected with it, but over those who had to test the results of his anxious labours in the class room, hospital stables, and college yard. And not less will it deeply affect the minds of those, and they are very numerous, who had the great satisfaction of knowing our deceased colleague intimately, and were permitted the privilege of sharing in his sterling friendship, and so appreciating him as he well deserved.

Professor Robertson died on the field of labour, as we fancy he would have chosen to do had Providence given him the option, and as many other scientists and toilers for the welfare of science and the benefit of humanity have done; for he was not only actively engaged in his scholastic duties, but at the moment of being called away was correcting the proofs of a work on Veterinary Surgery on which he had been closely engaged for some time. Thus, in addition to performing the important functions of administrator of his college and principal teacher, he was also striving to benefit the profession and enrich its literature, by giving us the fruits of his long and varied experience as a skilled and most successful practitioner of veterinary medicine and surgery. Surely no better testimony could be given of his devotion to his duty to his school, to his colleagues in the profession, to his science, and to his country.

Our lamented friend died at a comparatively early age, for he was only fifty-seven years old when he literally dropped his pen and closed his career for ever. As a student of the Clyde Street School in its, perhaps, brightest days, he attracted considerable notice because of his intense application to his studies, his ability, and his shrewdness. His previous training assisted him materially in the rapid progress he made; for though he had been brought up in the ways of a Scotch country practice, and had been accustomed to the hard drudgery of forge and saddle practice, he was at one time intended for the Kirk, and actually spent some time, we believe, at the Edinburgh University, studying Greek, Latin, and the other branches of learning necessary for that occupation. But his love for animals, and his early training and associations, no doubt led to the relinquishment of this idea, and made him adopt the veterinary profession. The influence and example of his chief teacher, Professor Dick, whom he much resembled in more points than one, exercised a wonderful power over him, as it did over so many of the

students of those days; and Robertson held his preceptor in a kind of veneration which never ceased to prevail. Graduating as a certificate-holder of the Highland and Agricultural Society of Scotland in 1852, he commenced practice at Kelso, on the Tweed, and soon won a high reputation as an able practitioner, astonishing the country people by his skill, and also by his endurance, his visits—only too often long and dreary—being made on horseback, the district not being well adapted for wheels. The number of miles he at times travelled in this way, in all weathers, was quite startling. In 1860, he became a member of the Royal College, and in that year was elected a member of the Examining Board for Scotland, a position he held for the long period of twenty years, during which time he chiefly examined on cattle pathology, and was considered one of the best examiners on the board. In 1879, he became a member of Council, and remained so to the time of his death. On the retirement of Professor Simonds from the Principalship of the Royal Veterinary College in 1880, Robertson succeeded to that very responsible, and somewhat onerous post—a rather trying change for a man at his time of life, but which his professional attainments, zeal and immense industry, integrity and tact, well qualified him to occupy. Rapidly overcoming the disadvantages under which he laboured, and abolishing the obstacles he encountered, he settled down to his work, and, owing to his invincible enthusiasm and the above-mentioned qualities, rendered the school more popular and useful than it had been for many years, if ever.

He was also of great assistance to the Royal Agricultural Society of England, for which he carried out important investigations; from early in his career he was a constant contributor to the veterinary journals; not long ago he published his important work on "Equine Medicine," and at the moment he died, as already stated, he was correcting the proofs of a companion work on surgery.

In this brief sketch, we feel we cannot do more than give scant justice to William Robertson; to attempt more would demand space which cannot be spared. But the great majority of our readers will be able to repair omissions, and fill in the outline we have hurriedly, but sincerely and sympathetically drawn of his character and career. To the Royal Veterinary College, his death at this juncture is little short of a serious disaster; to the profession it is a heavy blow; to his students, colleagues, and friends, it is a cruel deprivation; while to his wife and family, snatched as he was from them while yet in the prime of manhood, it is an affliction which only those who have been similarly bereaved can realise, and which a merciful Providence can alone provide for; but if sympathy can in any degree assuage grief such as this must evoke, then it will be offered to the mourners in no stinted measure.

The interment of our late friend and colleague took place at Highgate Cemetery, London, on the 19th December, and was largely attended by members of the profession and others, who paid their last respects to the memory and the remains of a good man.

Vale. Mors janua Vitæ.

Correspondence.

DAIRY COWS AND SCARLET FEVER.

SIR,—Last February Dr. Klein made an inquiry which, to him, appeared to establish the fact that milch cows could suffer from the horrible disease, Scarlet Fever. His conclusions were eagerly adopted by several influential organs of the daily press and by, *mirabile dictu*, the medical journals, to the great amazement of all who rightly think that *remarkable* discoveries should be received with caution. The veterinary profession was blamed for not having at once accepted Dr. Klein's investigations, and was charged with opposing inquiry when it was only acting with wise reserve. At the instance of the Agricultural Department of the Privy Council, the eminent bacteriologist, Professor Crookshank, has also investigated the subject, and has come to a diametrically opposite opinion to Dr. Klein. Professor Crookshank, after an apparently exhaustive inquiry, has arrived at the conclusion that the eruptive disease of cattle blamed as the cause of Scarlet Fever, has no connection with it, and that it is merely Vaccinia; and that, so far as being hurtful, it is to be welcomed as affording a much-needed supply of Jennerian vaccine lymph, to protect us from Small-pox. Instead, therefore, of being a curse, Professor Crookshank pronounces it a blessing. Doubtless, there will still be much controversy on the point amongst the rival bacteriologists. and the veterinary profession will therefore be wise in awaiting further proofs, so as to avoid coming to a rash and premature decision.

The question may well be asked, Why such investigations in animal diseases should have to be made by medical men, and why veterinary surgeons do not take a more prominent position in these matters? The answer is easy: we want our young and ambitious men to become students of the microscope and experimental research, and especially so in the province of bacteriology, which offers a wide field for fame, and also substantial rewards. The natural home for such researches in England, as distinguished from the remaining portions of the United Kingdom, should be the Royal Veterinary College of Camden Town, and it should not be transferred to the Brown Institute. It may be said that the Veterinary College has not funds for such work; but the question again arises whether the resources now at its command are not sufficient to enable it to prosecute valuable researches in the direction indicated, and if it should succeed, would not its success afford a powerful argument to those who wish that institution to obtain Government aid?

We cannot expect to receive public assistance unless we show that we deserve it.

With regard to the eruptive diseases of the udder of cattle, which more or less simulate Vaccinia, it may be pointed out that they were fully described by Dr. George Fleming in "Veterinary Sanitary Science and Police," in 1875.

London, *Dec. 17th*, 1887. JAMES LAMBERT, F.R.C.V.S.

ABNORMAL POSITION OF THE ŒSOPHAGUS.

SIR,—I found in treating a horse lately suffering from Influenza, that the œsophagus deviated from its normal course, in winding its way down the right side of the neck. I had every opportunity of observing it, as balls, frequently given, in every case passed down the right side.

Manchester. WM. WARD, M.R.C.V.S.

THE ARMY VETERINARY DEPARTMENT.

SIR,—Although good news does not travel with the proverbial rapidity of bad, I hear that my friends in the Army Veterinary Department are just now singing a hymn of praise to their chief, for the skill and tact with which he has succeeded in procuring a revision of the obnoxious clause 14 of the Royal Warrant of 1878. As I took upon myself to point out the anomalies of the clause in 1886, I may perhaps be permitted to constitute myself a mouthpiece for the thanks of the junior members of the Army Veterinary Department to you, sir, for permitting the subject to be ventilated, but, above all, to the principal veterinary surgeon for taking the matter up.

The success of Dr. Fleming's efforts appears to have removed a crushing feeling of insecurity, and the reaction will no doubt make itself felt at head-quarters by increased zeal, if possible, in the execution of duty.

This sense of relief must have extended with far greater force to the young wives of departmental officers, for the change of status entailed by a removal from the army would have affected them very painfully.

The Army Veterinary Department, in its troubles, compares very favourably with its sister—the medical staff—whose chief is at loggerheads with his subordinates; for whereas the P.V.S. fights for his staff and wins, the P.M.O. fights against his and will, most assuredly, be well beaten. The result is that, on one hand, there is a united corps, bound to its chief by feelings of personal gratitude; on the other, a department which, if the letters in the *British Medical Journal* go for anything, appears as near mutiny as officers and gentlemen can be.

London. J. F. OLIVER, M.R.C.V.S.

DAMAGING INTERFERENCE.

SIR,—May I draw attention to Professor Robertson's remarks at the recent meeting of the Royal Counties Veterinary Medical Association, when he explained why he was obliged to discontinue his most useful experiments with symptomatic Anthrax?

It appears that because he employed a skilled assistant his license was withdrawn, and he escaped prosecution by the skin of his teeth.

If Professor Robertson, for his private amusement, thrust hooks through the body of a wretched fish or frog and used it as live-bait, and allowed it to wriggle in agony until seized by a pike, or if he followed the advice of the fishing editor of a much-read weekly paper, and inserted a hook under the tail of a live shrimp, he would suffer no inconvenience; if he knocked some woman into a cocked hat, his punishment would probably be forty shillings or a month. But he was labouring, at the request of the leading agricultural societies, to prevent a ruinous disease of stock; he required an assistant, and employed Mr. Penberthy, *with the sanction of the inspector under the Act;* so his work was stopped by Mr. Matthews, just as the goal was in sight, and he was duly threatened with a fine of £50 or six months' imprisonment.

You will understand, sir, that Prof. Robertson was not fumbling about in the dark to find a remedy—the remedy has long been discovered and used on the Continent; he was merely adapting it to the English climate.

Of course, if he had been working at Rabies or the more fashionable Scarlatina, I could well understand every possible quibble being raised to stop his progress, because these matters are mostly connected with human life, in the public mind—human life which, after all, is of little monetary value

unless insured—and therefore a very proper subject for the sentimental interference of those who say that no amount of human suffering justifies the inoculation of a single animal to discover a cure; but "Blackleg" not merely decimates cattle, but impoverishes the farmer, and therefore I can hardly imagine that this latest intrigue of the anti-vivisectionists will be tolerated.

It is indeed saddening in these hard times, when the agriculturalist can barely subsist, that a fanatical clique, which dares not attack the amusements of the rich, but bullies the poor man and the scientist, should be able to squeeze a Minister to such an extent that he prevents the discovery for England of a remedy for one of the many drains upon the unhappy farmer's pocket.

There is little doubt that if this business is properly taken up by the profession, and if we explain to the agricultural community how Lord Randolph's pet Home Secretary presides over its interests, there will soon be a change in the voting or a cessation of such frivolous interference, and a return to more practical views. SACK.

TO CORRESPONDENTS.

F. H. FOSTER.—The widow of a non-qualified man, who died before the Veterinary Surgeons Act was passed, cannot legally put his name on labels or bill-heads if the designation of Veterinary Surgeon follows it.

JOE.—We answer your questions seriatim. 1. It might, though such cases must be very rare. 2. No. 3. No. 4. We never heard of such a result. 5. No. 6. It depends on circumstances. 7. The parietal portion remains. 8. It should constitute unsoundness in both. 9. Yes. You did not enclose your name.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from J. Lambert, A.V.D., London; W. Ward, Manchester; J. Cammack, Kimberley, South Africa; J. Pottinger, Poona, India; Dr. Duncan, Ontario; "Sack"; K. Lees, A.V.D., Newbridge; F. Smith, A.V.D., Aldershot; F. Duck, A.V.D., Aldershot; J. F. Oliver, London; F. Raymond, A.V.D., Woolwich; "Joe"; H. Begg, Glasgow; H. Kidd, Hungerford.

BOOKS AND PAMPHLETS: *N. H. Edalji Sukhia*, Manual of Comparative Anatomy of the Domesticated Animals; S. Rijks, Veeartsenijschool, Utrecht: Programma der Lessen; Encyklopädie der Gesammten Thierheilkunde und Thierzucht; *E. Dele*, Importation du Betail en Belgique par la Voie de Mer; *W. Dieckerhoff*, Lehrbuch der Speciellen Pathologie und Therapie für Thierarzte; *W. Hunting*, Glanders; *R. W. Burke*, Report on Surra.

JOURNALS, ETC.: *Repertorium der Thierheilkunde; American Veterinary Review; Recueil de Méd. Vétérinaire; Wochenschrift f. Thierheilkunde und Viehzucht; Der Thierarzt; Revue Vétérinaire; Clinica Veterinaria; Edinburgh Medical Journal; Journal de Méd. Vétérinaire; Echo Vétérinaire; Live Stock Journal; Lancet; American Live Stock Journal; Deutsche Zeitschrift f. Thiermedicin und Vergleichende Pathologie; Mark Lane Express; Journal of the Royal Agricultural Society of England; British Medical Journal; Hufschmied; London Medical Record; Journal of the National Agricultural Society of Victoria.*

NEWSPAPERS: *Nebraska Farmer; Eastern Counties Gazette; Glasgow Citizen.*